

**Nokia Customer Care**

# ***Service Manual***

**RM-237 (Nokia 3110c)**  
**Mobile Terminal**  
*Part No: 9201060 (Issue 1)*

***COMPANY CONFIDENTIAL***

**NOKIA**

## Amendment Record Sheet

Amendment No	Date	Inserted By	Comments
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## IMPORTANT

This document is intended for use by qualified service personnel only.

## Warnings and cautions

### Warnings

- IF THE DEVICE CAN BE INSTALLED IN A VEHICLE, CARE MUST BE TAKEN ON INSTALLATION IN VEHICLES FITTED WITH ELECTRONIC ENGINE MANAGEMENT SYSTEMS AND ANTI-SKID BRAKING SYSTEMS. UNDER CERTAIN FAULT CONDITIONS, EMITTED RF ENERGY CAN AFFECT THEIR OPERATION. IF NECESSARY, CONSULT THE VEHICLE DEALER/MANUFACTURER TO DETERMINE THE IMMUNITY OF VEHICLE ELECTRONIC SYSTEMS TO RF ENERGY.
- THE PRODUCT MUST NOT BE OPERATED IN AREAS LIKELY TO CONTAIN POTENTIALLY EXPLOSIVE ATMOSPHERES, FOR EXAMPLE, PETROL STATIONS (SERVICE STATIONS), BLASTING AREAS ETC.
- OPERATION OF ANY RADIO TRANSMITTING EQUIPMENT, INCLUDING CELLULAR TELEPHONES, MAY INTERFERE WITH THE FUNCTIONALITY OF INADEQUATELY PROTECTED MEDICAL DEVICES. CONSULT A PHYSICIAN OR THE MANUFACTURER OF THE MEDICAL DEVICE IF YOU HAVE ANY QUESTIONS. OTHER ELECTRONIC EQUIPMENT MAY ALSO BE SUBJECT TO INTERFERENCE.
- BEFORE MAKING ANY TEST CONNECTIONS, MAKE SURE YOU HAVE SWITCHED OFF ALL EQUIPMENT.

### Cautions

- Servicing and alignment must be undertaken by qualified personnel only.
- Ensure all work is carried out at an anti-static workstation and that an anti-static wrist strap is worn.
- Ensure solder, wire, or foreign matter does not enter the telephone as damage may result.
- Use only approved components as specified in the parts list.
- Ensure all components, modules, screws and insulators are correctly re-fitted after servicing and alignment.
- Ensure all cables and wires are repositioned correctly.
- During testing never activate the GSM transmitter without a proper antenna load, otherwise the GSM PA may be damaged.

## **For your safety**

### **QUALIFIED SERVICE**

Only qualified personnel may install or repair phone equipment.

### **ACCESSORIES AND BATTERIES**

Use only approved accessories and batteries. Do not connect incompatible products.

### **CONNECTING TO OTHER DEVICES**

When connecting to any other device, read its user's guide for detailed safety instructions. Do not connect incompatible products.

## Care and maintenance

This product is of superior design and craftsmanship and should be treated with care. The suggestions below will help you to fulfil any warranty obligations and to enjoy this product for many years.

- Keep the phone and all its parts and accessories out of the reach of small children.
- Keep the phone dry. Precipitation, humidity and all types of liquids or moisture can contain minerals that will corrode electronic circuits.
- Do not use or store the phone in dusty, dirty areas. Its moving parts can be damaged.
- Do not store the phone in hot areas. High temperatures can shorten the life of electronic devices, damage batteries, and warp or melt certain plastics.
- Do not store the phone in cold areas. When it warms up (to its normal temperature), moisture can form inside, which may damage electronic circuit boards.
- Do not drop, knock or shake the phone. Rough handling can break internal circuit boards.
- Do not use harsh chemicals, cleaning solvents, or strong detergents to clean the phone.
- Do not paint the phone. Paint can clog the moving parts and prevent proper operation.
- Use only the supplied or an approved replacement antenna. Unauthorised antennas, modifications or attachments could damage the phone and may violate regulations governing radio devices.

All of the above suggestions apply equally to the product, battery, charger or any accessory.

## ESD protection

Nokia requires that service points have sufficient ESD protection (against static electricity) when servicing the phone.

Any product of which the covers are removed must be handled with ESD protection. The SIM card can be replaced without ESD protection if the product is otherwise ready for use.

To replace the covers ESD protection must be applied.

All electronic parts of the product are susceptible to ESD. Resistors, too, can be damaged by static electricity discharge.

All ESD sensitive parts must be packed in metallized protective bags during shipping and handling outside any ESD Protected Area (EPA).

Every repair action involving opening the product or handling the product components must be done under ESD protection.

ESD protected spare part packages **MUST NOT** be opened/closed out of an ESD Protected Area.

For more information and local requirements about ESD protection and ESD Protected Area, contact your local Nokia After Market Services representative.

## Battery information

**Note:** A new battery's full performance is achieved only after two or three complete charge and discharge cycles!

The battery can be charged and discharged hundreds of times but it will eventually wear out. When the operating time (talk-time and standby time) is noticeably shorter than normal, it is time to buy a new battery.

Use only batteries approved by the phone manufacturer and recharge the battery only with the chargers approved by the manufacturer. Unplug the charger when not in use. Do not leave the battery connected to a charger for longer than a week, since overcharging may shorten its lifetime. If left unused a fully charged battery will discharge itself over time.

Temperature extremes can affect the ability of your battery to charge.

For good operation times with Ni-Cd/NiMH batteries, discharge the battery from time to time by leaving the product switched on until it turns itself off (or by using the battery discharge facility of any approved accessory available for the product). Do not attempt to discharge the battery by any other means.

Use the battery only for its intended purpose.

Never use any charger or battery which is damaged.

Do not short-circuit the battery. Accidental short-circuiting can occur when a metallic object (coin, clip or pen) causes direct connection of the + and - terminals of the battery (metal strips on the battery) for example when you carry a spare battery in your pocket or purse. Short-circuiting the terminals may damage the battery or the connecting object.

Leaving the battery in hot or cold places, such as in a closed car in summer or winter conditions, will reduce the capacity and lifetime of the battery. Always try to keep the battery between 15°C and 25°C (59°F and 77°F). A phone with a hot or cold battery may temporarily not work, even when the battery is fully charged. Batteries' performance is particularly limited in temperatures well below freezing.

Do not dispose of batteries in a fire!

Dispose of batteries according to local regulations (e.g. recycling). Do not dispose as household waste.

## Company Policy

Our policy is of continuous development; details of all technical modifications will be included with service bulletins.

While every endeavour has been made to ensure the accuracy of this document, some errors may exist. If any errors are found by the reader, NOKIA MOBILE PHONES Business Group should be notified in writing/e-mail.

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- Title of the Document + Issue Number/Date of publication
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## **Nokia 3110c Service Manual Structure**

- 1 General information
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- 3 Service Software Instructions
- 4 Service Tools and Service Concepts
- 5 Disassembly and reassembly instructions
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# Nokia Customer Care

## 1 — General information

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## ■ Product selection

The RM-237 is class 4 (max 2W) GSM tri-band hand portable phone, supporting GSM 900/1800/1900 band. The RM-237 also supports EGPRS and GPRS (Packed data). It is a class B&C terminal, supporting EGPRS multislot class 10 (4Rx + 1Tx and 3Rx + 2Tx) and GPRS multislot class 10 (4+1, 3+2).

The RM-237 is MMS (Multimedia Messaging Services) version 1.2 enabled phone with 128x160 pixel active matrix display supporting up to 262k colours. It also has an integrated 1.3 Mpix digital camera with a 8 x digital zoom.

The RM-237 has a 3GPP video player/recorder, a stereo FM radio and a music player, and it supports Bluetooth, microSD card and IrDa.

The XHTML/WAP browser in RM-237 is compatible with the version 2.0 specifications and it supports HTTP/TCP/IP stack.

In addition the RM-237 is a Java-enabled phone (Java™ 2 Platform, Micro Edition, for embedded devices). It supports MIDP Java 2.0 with additional APIs.

The supported user interface is S40, that is, RM-237 software is based on the ISA platform.



Figure 1 RM-237 product picture

## ■ Display and keypad features

- Main display: Active matrix display supporting up to 262k colors (128 x 160 pixels, 28.4 mm x 35.5 mm active area)
- Power switch
- Side volume keys

## ■ Features

### Hardware features

- Monoblock phone
- 1.3 Mpix camera with 8 x digital zoom
- 10MB physical internal user memory
- µSD memory card slot (up to 2GB)
- Stereo FM radio and music player
- Integrated handsfree speaker
- Internal vibra
- Bluetooth
- 2.0 mm DC charger plug
- Mini-USB connector
- 2.5mm Nokia AV connector

### Software features

- ISA OS 8.0s Platform
- Nokia Series 40 User interface (UI): Java™ MIDP 2.0

### UI features

Imaging	<ul style="list-style-type: none"> <li>• 1.3 megapixel camera with 8x digital zoom</li> <li>• Full-screen view finder</li> <li>• PictBridge printing via USB cable</li> <li>• Video recording in QCIF quality supported</li> <li>• Multimedia contents can be sent via MMS</li> </ul>
Multimedia	<ul style="list-style-type: none"> <li>• MP3 player supporting formats including MP3, Midi, AAC, AAC+, enhanced AAC+, WMA</li> <li>• FM stereo radio, Visual Radio and music player</li> <li>• 3GPP video player/recorder</li> <li>• MP3 ringing tones, True tones and MIDI tones, with support of 64 polyphony</li> </ul>
Memory functions	<ul style="list-style-type: none"> <li>• Combo memory with 32 MB flash and 16 MB RAM – about 10 MB physical internal user memory (for gallery and applications, contacts, notes, calendar entries)</li> <li>• Hotswap microSD memory card slot supporting up to 2GB microSD memory cards</li> </ul>



Messaging	<ul style="list-style-type: none"> <li>• Simplified messaging with recently used contacts log and groups</li> <li>• Email: Access your work and private email accounts; supports SMTP, POP3, and IMAP4 protocols. Support for attachments (Java version)</li> <li>• Audio messaging service (AMS): Record your own voice message and send to compatible devices</li> <li>• MMS OMA 1.2: Combine image, video, text, and voice clips and send as an MMS to a compatible phone or PC; use MMS to tell your story with a multi-slide presentation. The MMS OMA 1.2 specification allows you to send/receive messages up to 300 kB in size.</li> <li>• Text messaging: Supports concatenated SMS, picture messaging, SMS distribution list</li> <li>• Predictive text input: Support for all major languages in Europe and Asia-Pacific</li> <li>• Instant Messaging (IM)</li> </ul>
Applications	<ul style="list-style-type: none"> <li>• Java™ MIDP 2.0 with over-the-air download</li> <li>• Pre-installed Java™-based applications and games</li> <li>• SIM Application Toolkit</li> <li>• Wireless Presenter</li> </ul>
Connectivity	<ul style="list-style-type: none"> <li>• Nokia PC Suite with USB, Bluetooth and Infrared connectivity</li> <li>• SIM access profile and handsfree profile</li> <li>• Nokia AV connector interface with USB</li> <li>• Active standby</li> <li>• FOTA (Flashing over-the-air)</li> <li>• Local/remote SyncML data synchronization</li> <li>• E-mail client with support for attachments</li> </ul>
Browsing	<ul style="list-style-type: none"> <li>• Integrated XHTML browser</li> <li>• Smart content download - OMA DRM 2.0</li> </ul>
Data transfer	<ul style="list-style-type: none"> <li>• EDGE (EGPRS): Class 10, download up to 236.8 kbps</li> <li>• GPRS: Class 10, download up to 53.6 kbps</li> <li>• <b>Note:</b> Actual achieved speeds may vary depending on network support</li> <li>• GPRS/EDGE/HSCSD/CSD for browsing and as data modem</li> <li>• Downlink Advanced Receiver Performance (DARF)</li> </ul>
Voice features	<ul style="list-style-type: none"> <li>• Push To Talk: Select the person or group you want to talk to and press the Push To Talk key to communicate</li> <li>• Enhanced voice dialling with SIND: Speaker-independent name dialling for easy call handling</li> <li>• Integrated handsfree speaker with a new high quality speaker for better audio experience (stereo widening effects when attaching the headset)</li> <li>• FM stereo radio enhanced by the Visual Radio application</li> <li>• Voice commands</li> <li>• Voice recorder</li> </ul>

Digital services	<ul style="list-style-type: none"> <li>User Interface (UI) themes including e.g. animated wallpapers, screensavers, color schemes, ringing tones</li> <li>Ringing tones: Video, MP3 ringing tones, True Tones and MIDI ringing, alert, and gaming tones with support of 64 polyphonies</li> <li>OTA download possibility for: Themes, True Tones, MP3 ringing tones, MIDI ringing tones, screensavers, wallpapers, 3GPP streaming, images and videos, Series 40 Java games and applications</li> </ul>
Personal information management (PIM)	<ul style="list-style-type: none"> <li>Organizer with alarm clock, calendar, to-do list, notes, calculator, countdown timer, and stopwatch</li> <li>Manage your time and information with the enhanced calendar that can be synchronized, for example, with Microsoft and Lotus PIM application calendars by using the Nokia PC Suite</li> </ul>
Call management	<ul style="list-style-type: none"> <li>Speed dialling</li> <li>Speaker independent number/name dialing for easy call handling</li> <li>Logs: Keeps lists of your dialled, received, and missed calls</li> <li>Automatic answer (works with headset or car kit only)</li> <li>Call waiting, call hold, call divert, call timer</li> </ul>

## Mobile enhancements

### Mobile enhancements for RM-237

Table 1 Power

Type	Name
<b>Note:</b> This phone is charged through the smaller Nokia standard interface (2.0 mm plug). The 3.5 mm standard charger can be used together with the CA-44 charger adapter.	
AC-3/AC-5	Compact charger
AC-4	Travel charger
BL-5C	Battery 1020 mAh Li-Ion
CA-44	Charger adapter (from 3.5 mm -> 2 mm)

Table 2 Car

Type	Name
CK-1W	Wireless car kit
CK-7W	Basic universal car kit
CK-20W	Car Installation Kit
CR-39	Universal holder
DC-4	Mobile charger
HF-35W	Wireless Car Handsfree
N616	Car phone

**Table 3 Audio**

Type	Name
AD-42W	Wireless audio gateway
HS-40	Mono headset
HS-16, HS-42, HS-47	Stereo headsets
HS-44	Wired headset
BH-300, BH-601, BH-700, BH-800, BH-900, HS-4W, HS-50W	Wireless mono headsets
HS-21W, HS-24W, HS-25W, HS-26W, HS-34W, HS-36W, HS-37W, HS-57W, HS-58W	Wireless stereo headsets

**Table 4 Data**

Type	Name
DKE-2	Mini USB connectivity cable
MU-22	1 GB µSD card
MU-26	128 MB µSD card
MU-27	256 MB µSD card
MU-28	512 MB µSD card
MU-37	2 GB µSD card

**Table 5 Imaging**

Type	Name
PT-6	Remote camera

## ■ Technical specifications

### General specifications

Unit	Dimension (mm)	Weight (g)	Volume (cc)
Transceiver with BL-5C 1020 mAh Li-Ion battery pack	108,5 x 45,7 x 15,6	87	72

### Battery endurance

Battery	Talk time	Standby time	Music time
BL-5C 1020 mAh Li-ion	4-4.5 hours	Up to 350 hours	> 12 hours

**Note:** Variation in operation times will occur depending on SIM card, network settings and usage. Talk time is increased by up to 30% if half rate is active, and reduced by 5% if enhanced full rate is active.

### Environmental conditions

#### Temperature

Temperature range	Min °C	Max °C
Operational (all specs met)	-5	+55
Functional (reduced performance)	-30	+70
Storage	-30	+85

The HW module complies with the SPR4 Operating Conditions.

#### Humidity

Relative humidity range is 5...95%.

The hardware module is not protected against water. Condensed or splashed water might cause malfunction. Any submerge of the phone will cause permanent damage. Long-term high humidity, with condensation, will cause permanent damage because of corrosion.

The hardware module complies with the SPR4 Operating Conditions.

### Electrical characteristics

Table 6 Normal and extreme voltages

Voltage	Voltage (V)	Condition
General conditions		
Nominal voltage	3.7	
Lower extreme voltage	3.06	a

Voltage	Voltage (V)	Condition
Higher extreme voltage	4.2	b

- a. ADC settings in the SW might shutdown the phone above this value.
- b. During fast charging of an empty battery, this voltage might exceed this value. Voltages between 4.20 and 4.60 might appear for a short while.

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## 2 — Parts and layouts

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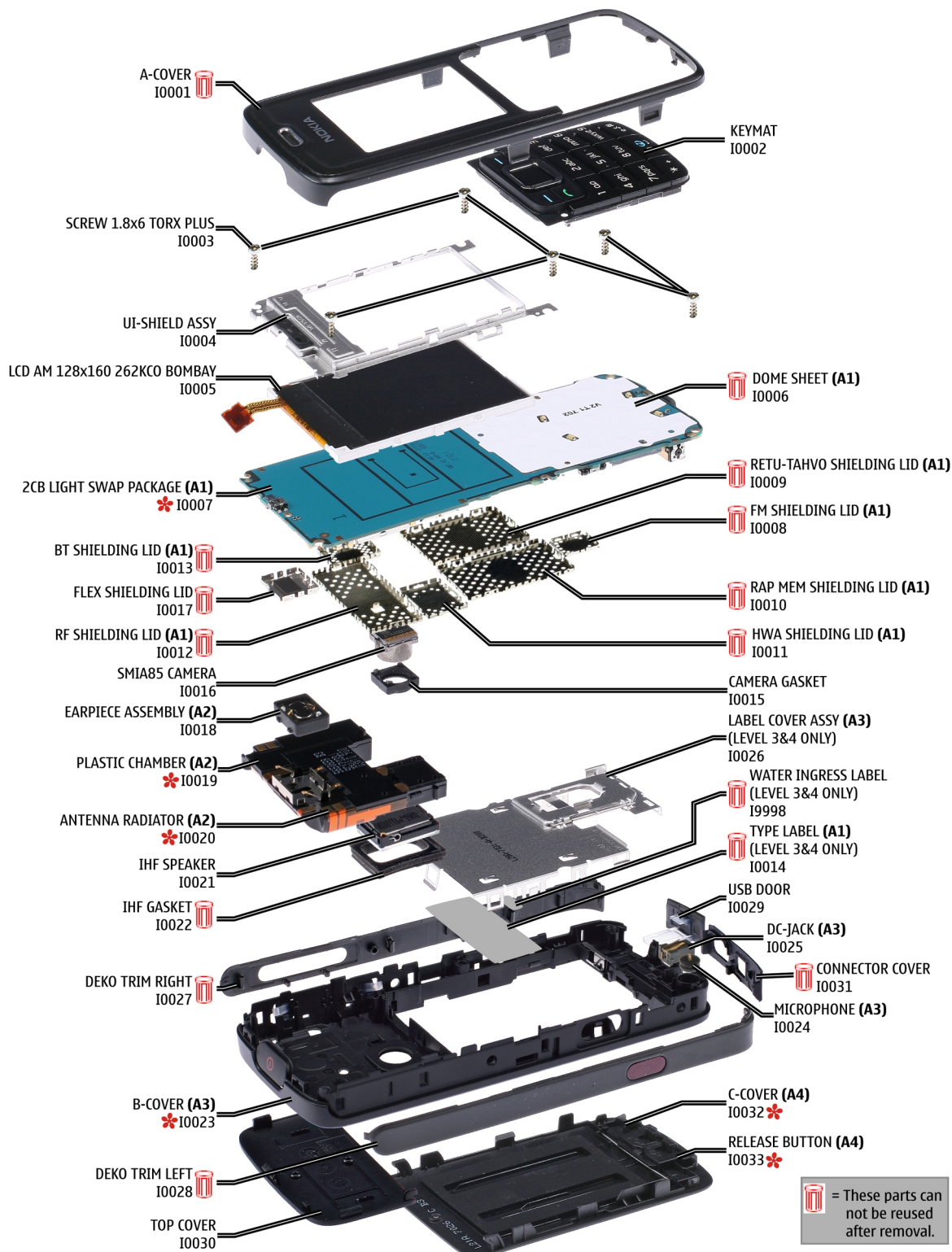
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## ■ Exploded view

### Exploded view



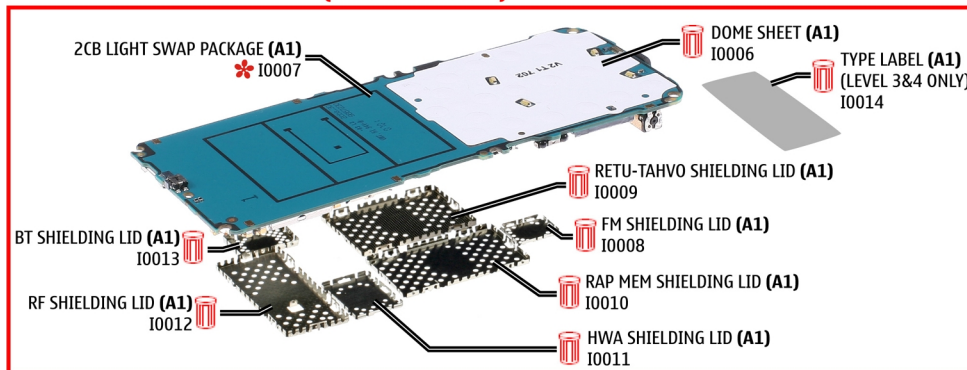
Ver. 3.0

= These parts can not be reused after removal.

= only available as assembly

## Mechanical spare parts overview

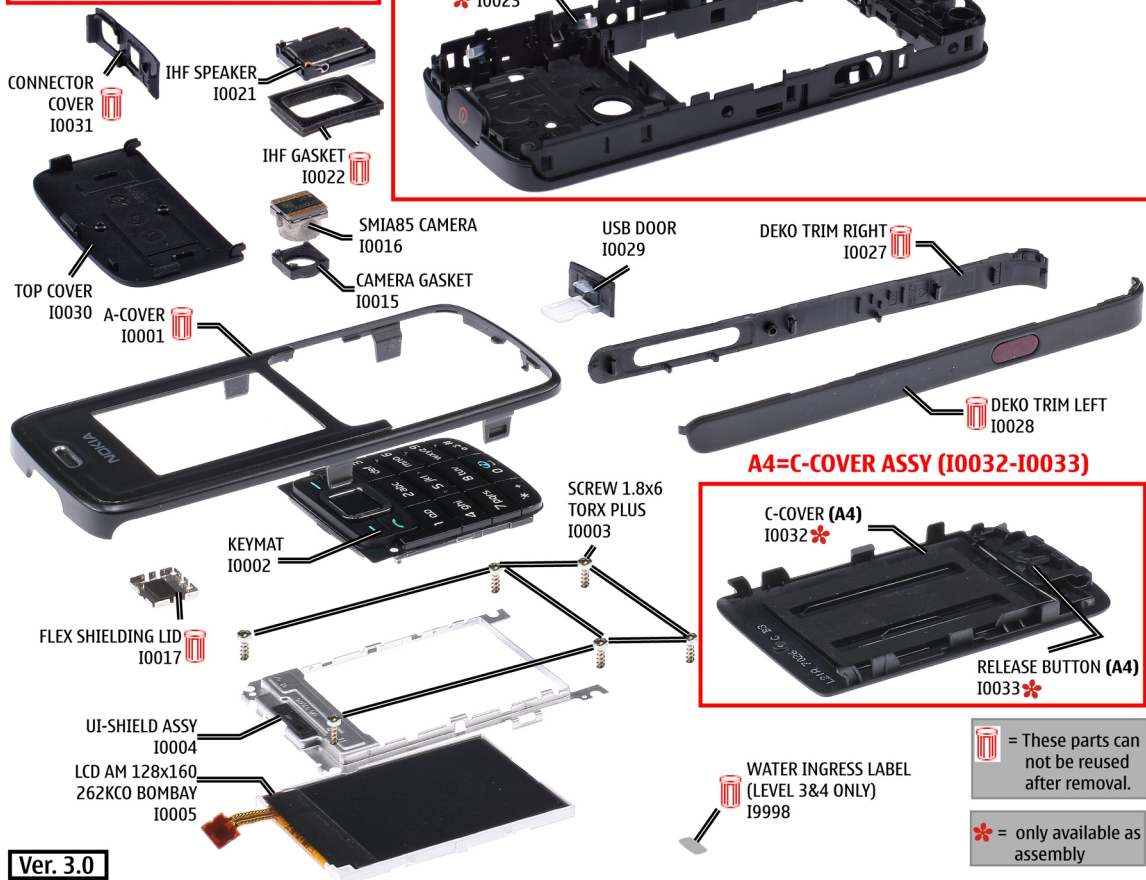
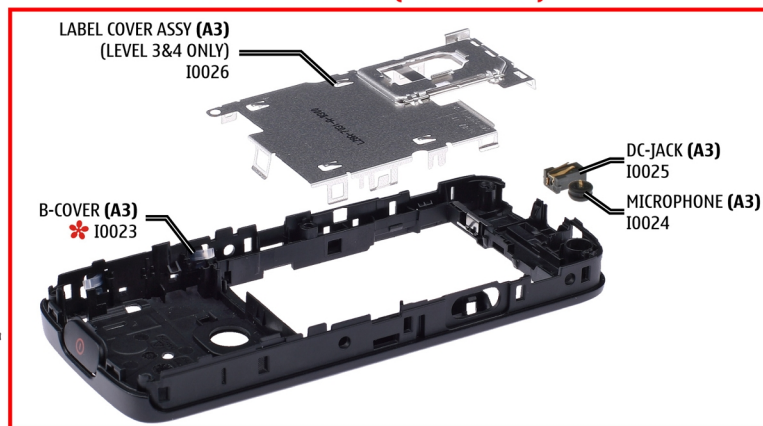
### A1= 2CB LIGHT SWAP PACKAGE (I0006-I0014) (LEVEL 3&4 ONLY)



### A2=ANTENNA MODULE ASSY (I0018-I0020)



### A3=B-COVER ASSY (I0023-I0026)



Ver. 3.0

= These parts can not be reused after removal.

= only available as assembly

## ■ Parts list

### Mechanical spare parts list

**Note:** For Nokia product codes, please refer to the latest Service Bulletins on the Partner Website (PWS).

To ensure you are always using the latest codes, please check the PWS on a daily basis.

"\*" = Spare part can not be reused after disassembly.

ITEM/CIRCUIT REF.	QTY	SPARE PART DESCRIPTION	EUROPE	MEA	APAC	CHINA
I0001*	1	A-COVER				
I0001*	1	A-COVER ASSY	X	X	X	X
I0002	1	KEYMAT				
I0002	1	KEYMAT STROKE S			X	X
I0002	1	KEYMAT LATIN	X	X	X	
I0002	1	KEYMAT THAI			X	
I0002	1	KEYMAT STROKE			X	
I0002	1	KEYMAT HINDI			X	
I0002	1	KEYMAT GUJARATI			X	
I0002	1	KEYMAT BENGALI			X	
I0002	1	KEYMAT PUNJABI			X	
I0002	1	KEYMAT TAMIL			X	
I0002	1	KEYMAT TELUGU			X	
I0002	1	KEYMAT KANNADA			X	
I0002	1	KEYMAT MALAYALAM			X	
I0002	1	KEYMAT HEBREW		X		
I0002	1	KEYMAT GREEK	X			
I0002	1	KEYMAT CYRILLIC	X			
I0002	1	KEYMAT ARABIC		X	X	
I0002	1	KEYMAT URDU			X	
I0002	1	KEYMAT FARSI			X	
I0002	1	KEYMAT BOPOMOFO			X	X
I0002	1	KEYMAT SINHALA			X	
I0003	6	SCREW M1.8X6 TORX PLUS	X	X	X	X
I0004	1	UI SHIELD ASSEMBLY	X	X	X	X
I0005	1	LCD MODULE	X	X	X	X
<b>A1</b>	<b>1</b>	<b>2CB LIGHT SWAP PACKAGE (I0006 - I0014)</b>				
I0006*	1	DOMESHEET	X	X	X	X

ITEM/CIRCUIT REF.	QTY	SPARE PART DESCRIPTION	EUROPE	MEA	APAC	CHINA
I0007	1	2CB LIGHT SWAP MODULE				
I0008*	1	FM SHIELDING LID	X	X	X	X
I0009*	1	RETU-TAHVO SHIELDING LID	X	X	X	X
I0010*	1	RAP MEM SHIELDING LID	X	X	X	X
I0011*	1	HWA SHIELDING LID	X	X	X	X
I0012*	1	RF SHIELDING LID	X	X	X	X
I0013*	1	BT SHIELDING LID	X	X	X	X
I0014*	1	TYPE LABEL	X	X	X	X
I0015	1	CAMERA GASKET	X	X	X	X
I0016	1	SMIA85 CAMERA	X	X	X	X
I0017*	1	FLEX SHIELDING LID ASSY	X	X	X	X
<b>A2</b>	<b>1</b>	<b>ANTENNA MODULE ASSY (I0018 - I0020)</b>	X	X	X	X
I0018	1	EARPIECE ASSEMBLY	X	X	X	X
I0019	1	PLASTIC CHAMBER				
I0020	1	ANTENNA RADIATOR				
I0021	1	IHF SPEAKER	X	X	X	X
I0022*	1	IHF GASKET	X	X	X	X
<b>A3</b>	<b>1</b>	<b>B-COVER ASSY (I0023 - I0026)</b>	X	X	X	X
A3	1	B-COVER ASSY BLACK	X	X	X	X
I0023	1	B-COVER	X	X	X	X
I0024	1	MICROPHONE	X	X	X	X
I0025	1	DC-JACK	X	X	X	X
I0026	1	LABEL COVER ASSY	X	X	X	X
I9998	1	WATER INGRESS LABEL				
I0027*	1	DEKO TRIM RIGHT	X	X	X	X
I0027*	1	SIDE INSERT RIGHT PAINTED	X	X	X	X
I0028*	1	DEKO TRIM LEFT	X	X	X	X
I0028*	1	SIDE INSERT LEFT ASSY	X	X	X	X
I0029	1	USB DOOR	X	X	X	X
I0030	1	TOP COVER	X	X	X	X
I0031*	1	CONNECTOR COVER	X	X	X	X
<b>A4</b>	<b>1</b>	<b>C-COVER ASSY (I0032 - I0033)</b>				

ITEM/CIRCUIT REF.	QTY	SPARE PART DESCRIPTION	EUROPE	MEA	APAC	CHINA
A4	1	C-COVER ASSEMBLY	X	X	X	X
I0032	1	C-COVER				
I0033	1	RELEASE BUTTON				

### Component parts list (2cba\_31a)

Item ref	PWB side	X	Y	Description and value
A2200	Bottom	K	4	RETU TAHVO SHIELD ASSY
A2400	Bottom	T	3	FLEX SHIELD FRAME
A2800	Bottom	K	7	RAP_MEM SHIELD ASSY
A3300	Bottom	O	8	HW_ACC ASSEMBLY
A6000	Bottom	Q	2	BT SHIELD ASSY
A6100	Bottom	H	7	FM SHIELD ASSY
A7000	Bottom	R	6	RF ASSEMBLY
B2100	Bottom	B	8	CLAPTON EMC MICROPHONE MOD -4
B2101	Bottom	T	7	EARP RDF-07A 320HM 10.86x7.40
B2200	Bottom	M	3	CRYSTAL 32.768KHZ +/-30PPM 12
C2000	Bottom	A	4	CHIPCAP NP0 27P J 50V
C2001	Bottom	B	4	CHIPCAP X5R 470N K 25V
C2002	Bottom	B	3	CHIPCAP X7R 10N K 50V
C2008	Bottom	C	3	CHIPCAP X7R 1N0 K 50V
C2030	Bottom	E	5	CHIPCAP NP0 270P J 50V
C2031	Bottom	E	5	CHIPCAP X7R 1N0 K 50V
C2032	Bottom	D	5	CHIPCAP X7R 10N K 16V
C2033	Bottom	E	5	CHIPCAP X7R 33N K 10V
C2034	Bottom	E	5	CHIPCAP X7R 33N K 10V
C2035	Bottom	C	6	CHIPCAP NP0 27P J 50V
C2040	Bottom	H	6	CHIPCAP X5R 2U2 K 6V3
C2041	Bottom	C	4	CHIPCAP X5R 2U2 K 6V3
C2042	Bottom	D	4	CHIPCAP X7R 1N0 K 50V
C2043	Bottom	C	4	CHIPCAP X7R 1N0 K 50V
C2044	Bottom	C	5	CHIPCAP NP0 18P J 50V
C2045	Bottom	D	5	CHIPCAP NP0 18P J 50V
C2046	Bottom	C	4	CHIPCAP X5R 100N K 16V
C2047	Bottom	C	4	CHIPCAP X5R 4U7 K 6.3V



Item ref	PWB side	X	Y	Description and value
C2048	Bottom	C	3	CHIPCAP X5R 2U2 K 6V3
C2049	Bottom	H	5	CHIPCAP X5R 1U K 6V3
C2050	Bottom	D	5	CHIPCAP X7R 10N K 16V
C2051	Bottom	H	5	CHIPCAP X5R 1U K 6V3
C2052	Bottom	C	5	CHIPCAP NP0 27P J 50V
C2071	Bottom	Q	4	CHIPCAP NP0 27P J 50V
C2073	Bottom	S	3	CHIPTCAP 150U M 10V 6X3.2X1.5
C2074	Bottom	L	2	CHIPCAP X7R 10N K 16V
C2076	Bottom	Q	4	CHIPCAP X7R 10N K 16V
C2077	Bottom	M	2	CHIPCAP X5R 1U K 6V3
C2078	Bottom	M	2	CHIPCAP NP0 27P J 50V
C2079	Bottom	E	5	CHIPCAP X7R 1N0 K 50V
C2080	Bottom	E	5	CHIPCAP X7R 10N K 16V
C2100	Bottom	G	5	CHIPCAP X7R 33N K 10V
C2101	Bottom	G	5	CHIPCAP X7R 33N K 10V
C2102	Bottom	H	6	CHIPCAP X5R 2U2 K 6V3
C2103	Bottom	O	2	CHIPCAP NP0 27P J 50V
C2104	Bottom	O	2	CHIPCAP NP0 27P J 50V
C2200	Bottom	M	5	CHIPCAP X5R 1U K 6V3
C2201	Bottom	M	3	CHIPCAP X5R 1U K 6V3
C2202	Bottom	N	2	CHIPCAP X7R 1N0 K 50V
C2203	Bottom	M	4	CHIPCAP X7R 1N0 K 50V
C2204	Bottom	M	4	CHIPCAP X7R 1N0 K 50V
C2205	Bottom	M	5	CHIPCAP X7R 1N0 K 50V
C2206	Bottom	M	4	CHIPCAP X7R 1N0 K 50V
C2207	Bottom	N	3	CHIPCAP X7R 1N0 K 50V
C2208	Bottom	N	4	CHIPCAP NP0 27P J 50V
C2209	Bottom	N	3	CHIPCAP NP0 22P J 50V
C2210	Bottom	K	3	CHIPCAP X5R 1U K 16V
C2211	Bottom	K	3	CHIPCAP X5R 4U7 K 10V
C2212	Bottom	K	4	CHIPCAP X5R 1U5 K 4V
C2213	Bottom	L	3	CHIPCAP X5R 1U5 K 4V
C2214	Bottom	L	3	CHIPCAP X5R 1U5 K 4V
C2215	Bottom	L	2	CHIPCAP X5R 1U5 K 4V
C2216	Bottom	L	2	CHIPCAP X5R 1U5 K 4V



Item ref	PWB side	X	Y	Description and value
C2217	Bottom	M	3	CHIPCAP X5R 1U5 K 4V
C2219	Bottom	M	3	CHIPCAP X5R 1U5 K 4V
C2220	Bottom	K	4	CHIPCAP X5R 1U5 K 4V
C2221	Bottom	K	2	CHIPCAP X5R 1U K 6V3
C2222	Bottom	K	3	CHIPCAP X5R 1U K 6V3
C2223	Bottom	L	5	CHIPCAP X7R 10N K 16V
C2224	Bottom	M	5	CHIPCAP X7R 10N K 16V
C2225	Bottom	M	3	CHIPCAP X5R 1U K 6V3
C2226	Bottom	L	3	CHIPCAP X5R 1U K 6V3
C2227	Bottom	K	3	CHIPCAP X5R 1U K 6V3
C2228	Bottom	L	3	CHIPCAP X5R 1U K 6V3
C2230	Bottom	M	3	CHIPCAP X5R 1U K 6V3
C2231	Bottom	K	5	CHIPCAP X5R 10U M 6V3
C2232	Bottom	L	3	CHIPCAP X5R 1U K 6V3
C2270	Bottom	L	5	CHIPCAP X7R 1N0 K 50V
C2271	Bottom	L	5	CHIPCAP X7R 1N0 K 50V
C2272	Bottom	L	5	CHIPCAP X7R 1N0 K 50V
C2273	Bottom	K	4	CHIPCAP X7R 1N0 K 50V
C2274	Bottom	K	4	CHIPCAP X7R 1N0 K 50V
C2275	Bottom	K	5	CHIPCAP X7R 1N0 K 50V
C2281	Bottom	L	2	CHIPCAP X5R 1U K 6V3
C2300	Bottom	J	4	CHIPCAP X7R 10N K 16V
C2301	Bottom	I	5	CHIPCAP X5R 22U M 6V3 0805
C2302	Bottom	K	5	CHIPCAP X5R 22U M 6V3 0805
C2303	Bottom	I	3	CHIPCAP X5R 1U K 6V3
C2304	Bottom	K	4	CHIPCAP X7R 10N K 16V
C2305	Bottom	I	2	CHIPCAP X5R 1U K 6V3
C2306	Bottom	I	4	CHIPCAP X5R 1U K 6V3
C2307	Bottom	I	4	CHIPCAP X5R 1U K 6V3
C2309	Bottom	I	5	CHIPCAP X5R 22U M 6V3 0805
C2312	Bottom	I	4	CHIPCAP X5R 1U K 6V3
C2313	Bottom	I	3	CHIPCAP X5R 1U K 6V3
C2314	Bottom	J	3	CHIPCAP X5R 4U7 K 10V
C2315	Bottom	K	2	CHIPCAP X5R 4U7 M 25V 0805
C2317	Bottom	J	2	CHIPCAP NP0 27P J 50V

Item ref	PWB side	X	Y	Description and value
C2403	Bottom	N	2	CHIPCAP NP0 47P J 50V
C2404	Bottom	T	3	CHIPCAP X7R 4N7 K 25V
C2405	Bottom	H	5	CHIPCAP X5R 100N K 16V 0402
C2413	Bottom	I	2	CHIPCAP NP0 27P J 50V
C2414	Bottom	T	3	CHIPCAP NP0 27P J 50V
C2415	Bottom	T	4	CHIPCAP NP0 27P J 50V
C2416	Bottom	T	4	CHIPCAP X5R 100N K 16V 0402
C2417	Bottom	T	3	CHIPCAP X5R 100N K 16V 0402
C2418	Bottom	T	3	CHIPCAP NP0 27P J 50V
C2600	Bottom	H	8	CHIPCAP X5R 4U7 K 6V3
C2601	Bottom	H	9	CHIPCAP NP0 27P J 50V
C2602	Bottom	G	9	CHIPCAP X5R 100N K 10V
C2603	Bottom	H	8	CHIPCAP NP0 27P J 50V
C2700	Bottom	H	3	CHIPCAP X5R 100N K 16V 0402
C2701	Bottom	H	3	CHIPCAP NP0 27P J 50V
C2800	Bottom	L	9	CHIPCAP X5R 100N K 16V 0402
C2801	Bottom	N	8	CHIPCAP X5R 100N K 16V 0402
C2802	Bottom	M	9	CHIPCAP X5R 100N K 16V 0402
C2803	Bottom	L	9	CHIPCAP X5R 100N K 16V 0402
C2804	Bottom	N	8	CHIPCAP X5R 100N K 16V 0402
C2805	Bottom	K	6	CHIPCAP X5R 100N K 16V 0402
C2807	Bottom	N	9	CHIPCAP X5R 1U K 6V3
C2808	Bottom	M	9	CHIPCAP X5R 100N K 16V 0402
C2809	Bottom	M	9	CHIPCAP X5R 100N K 16V 0402
C2810	Bottom	K	9	CHIPCAP X5R 100N K 16V 0402
C2811	Bottom	K	6	CHIPCAP X5R 100N K 16V 0402
C2812	Bottom	L	9	CHIPCAP X5R 100N K 16V 0402
C2813	Bottom	N	6	CHIPCAP X5R 100N K 16V 0402
C2814	Bottom	M	9	CHIPCAP X5R 100N K 16V 0402
C2815	Bottom	K	9	CHIPCAP X5R 100N K 16V 0402
C2816	Bottom	K	8	CHIPCAP NP0 27P J 50V
C2818	Bottom	K	7	CHIPCAP X5R 100N K 16V 0402
C2819	Bottom	K	8	CHIPCAP X5R 100N K 16V 0402
C2820	Bottom	N	7	CHIPCAP X5R 100N K 16V 0402
C2821	Bottom	N	7	CHIPCAP NP0 27P J 50V

Item ref	PWB side	X	Y	Description and value
C2830	Bottom	N	8	CHIPCAP X7R 1N0 K 50V
C2831	Bottom	N	8	CHIPCAP NP0 1P0 C 50V
C3000	Bottom	I	6	CHIPCAP X5R 100N K 16V 0402
C3001	Bottom	J	6	CHIPCAP X7R 10N K 16V
C3002	Bottom	J	6	CHIPCAP X5R 100N K 16V 0402
C3003	Bottom	K	9	CHIPCAP X7R 10N K 16V
C3004	Bottom	K	9	CHIPCAP X5R 100N K 16V 0402
C3005	Bottom	J	9	CHIPCAP X5R 100N K 16V 0402
C3006	Bottom	I	9	CHIPCAP X5R 100N K 16V 0402
C3007	Bottom	J	9	CHIPCAP X7R 10N K 16V
C3008	Bottom	J	9	CHIPCAP X5R 100N K 16V 0402
C3009	Bottom	I	9	CHIPCAP X5R 100N K 16V 0402
C3010	Bottom	N	6	CHIPCAP X5R 100N K 16V 0402
C3013	Bottom	K	7	CHIPCAP NP0 27P J 50V
C3014	Bottom	K	7	CHIPCAP NP0 68P J 50V
C3100	Bottom	E	2	CHIPCAP NP0 27P J 50V
C3115	Bottom	O	7	CHIPCAP X5R 1U K 6V3 0402
C3116	Bottom	O	7	CHIPCAP X7R 10N K 16V
C3200	Bottom	G	8	CHIPCAP X5R 100N K 16V 0402
C3201	Bottom	H	8	CHIPCAP X5R 1U K 6V3 0402
C3202	Bottom	H	8	CHIPCAP X7R 10N K 16V
C3203	Bottom	G	8	CHIPCAP X5R 1U K 6V3 0402
C3210	Bottom	G	8	CHIPCAP NP0 27P J 50V
C3211	Top	D	9	CHIPCAP NP0 27P J 50V
C3300	Bottom	P	7	CHIPCAP X5R 100N K 16V 0402
C3301	Bottom	N	5	CHIPCAP X5R 100N K 16V 0402
C3302	Bottom	N	5	CHIPCAP X5R 220N K 6.3V 04
C3303	Bottom	O	8	CHIPCAP X5R 100N K 16V 0402
C3304	Bottom	O	8	CHIPCAP X7R 10N K 16V
C3305	Bottom	O	7	CHIPCAP X5R 4U7 K 6.3V 060
C3306	Bottom	O	9	CHIPCAP X5R 4U7 K 6.3V 060
C3307	Bottom	O	8	CHIPCAP X5R 10UF 6V3 0603
C3308	Bottom	N	6	CHIPCAP X5R 1U K 6V3 0402
C3309	Bottom	N	5	CHIPCAP NP0 27P J 50V
C3310	Bottom	P	7	CHIPCAP NP0 27P J 50V

Item ref	PWB side	X	Y	Description and value
C3313	Bottom	O	8	CHIPCAP X7R 10N K 16V
C3314	Bottom	P	8	CHIPCAP X7R 10N K 16V
C6020	Bottom	T	2	CHIPCAP NP0 1P5 C 50V
C6031	Bottom	R	2	CHIPCAP NP0 18P J 50V
C6032	Bottom	P	3	CHIPCAP NP0 100P J 50V
C6033	Bottom	P	3	CHIPCAP X7R 10N K 16V
C6034	Bottom	P	3	CHIPCAP X7R 10N K 16V
C6035	Bottom	P	2	CHIPCAP X7R 10N K 16V
C6036	Bottom	P	3	CHIPCAP X7R 10N K 16V
C6037	Bottom	P	2	CHIPCAP X5R 1U5 K 4V 0402
C6038	Bottom	Q	2	CHIPCAP X7R 10N K 16V
C6039	Bottom	Q	3	CHIPCAP NP0 18P J 50V
C6040	Bottom	P	2	CHIPCAP X5R 1U K 6V3 0402
C6051	Bottom	Q	3	CHIPCAP NP0 2P7 C 50V
C6052	Bottom	Q	2	CHIPCAP NP0 2P7 C 50V
C6055	Bottom	Q	3	CHIPCAP X5R 1U K 6V3
C6100	Bottom	G	7	CHIPCAP X5R 100N K 16V 0402
C6101	Bottom	H	6	CHIPCAP X5R 100N K 16V 0402
C6102	Bottom	G	7	CHIPCAP X7R 10N K 16V
C6103	Bottom	G	7	CHIPCAP X5R 100N K 16V 0402
C6104	Bottom	H	6	CHIPCAP NP0 47P J 50V
C6105	Bottom	G	6	CHIPCAP NP0 100P J 50V
C6106	Bottom	H	6	CHIPCAP NP0 27P J 50V
C6107	Bottom	H	7	CHIP ARRAY X5R 2X100N M 10V
C6108	Bottom	H	6	CHIP ARRAY X5R 2X100N M 10V
C6109	Bottom	G	7	CHIPCAP X5R 1U5 K 4V 0402
C6111	Bottom	N	5	CHIPCAP X5R 100N K 16V 0402
C6112	Bottom	N	5	CHIPCAP X5R 100N K 16V 0402
C7000	Bottom	U	8	CHIPCAP NP0 1P5 C 50V
C7001	Bottom	T	9	CHIPCAP NP0 1P5 C 50V
C7501	Bottom	S	5	CHIPCAP NP0 2P7 C 50V
C7502	Bottom	Q	5	CHIPCAP NP0 0P5 C 50V
C7503	Bottom	Q	5	CHIPCAP X5R 1U K 6V3
C7504	Bottom	S	5	CHIPCAP X5R 1U K 6V3
C7505	Bottom	Q	5	CHIPCAP X5R 1U K 6V3 0402

Item ref	PWB side	X	Y	Description and value
C7506	Bottom	Q	5	CHIPCAP X5R 1U5 K 4V 0402
C7507	Bottom	Q	4	CHIPCAP X7R 10N K 16V
C7508	Bottom	Q	5	CHIPCAP NP0 18P J 50V
C7509	Bottom	R	5	CHIPCAP X7R 10N K 16V
C7511	Bottom	R	4	CHIPCAP NP0 2N2 G 16V
C7513	Bottom	Q	4	CHIPCAP X7R 10N K 16V
C7515	Bottom	S	5	CHIPCAP NP0 4P7 C 50V
C7516	Bottom	S	5	CHIPCAP NP0 470P J 50V 0402
C7518	Bottom	Q	5	CHIPCAP X5R 100N K 16V 0402
C7520	Bottom	S	8	CHIPCAP NP0 3P3 C 50V
C7521	Bottom	S	8	CHIPCAP NP0 1P5 C 50V
C7522	Bottom	Q	8	CHIPCAP NP0 1P8 C 50V
C7523	Bottom	S	8	CHIPCAP X5R 1U K 6V3 0402
C7524	Bottom	Q	8	CHIPCAP X5R 1U K 6V3 0402
C7525	Bottom	Q	9	CHIPCAP NP0 18P J 50V
C7560	Bottom	R	4	CHIPCAP NP0 1P2 C 50V
C7561	Bottom	R	4	CHIPCAP X7R 820P J 50V
C7562	Bottom	Q	6	CHIPCAP NP0 39P J 50V
C7563	Bottom	Q	6	CHIPCAP NP0 47P J 50V
C7564	Bottom	S	5	CHIPCAP X5R 100N K 16V 0402
C7565	Bottom	Q	6	CHIPCAP NP0 47P J 50V
C7566	Bottom	R	5	CHIPCAP NP0 4P7 C 50V
D2200	Bottom	L	4	RETU 3.02 LF TSA1GJWE TFBG
D2800	Bottom	L	7	RAPGSM PA v1.1 LF C027 uBGA28
D3000	Bottom	J	7	COMBO 256M NOR + 128M DDR DRA
D3300	Bottom	O	8	HW ACCELERATOR STV0984N
E2001	Bottom	D	4	No description in PDM
E2002	Bottom	A	7	No description in PDM
E2003	Bottom	D	5	No description in PDM
E2010	Bottom	A	7	No description in PDM
E2070	Bottom	P	3	No description in PDM
E2071	Bottom	P	4	No description in PDM
E2075	Bottom	P	4	No description in PDM
E2101	Bottom	Q	7	No description in PDM
E2102	Bottom	Q	9	No description in PDM

Item ref	PWB side	X	Y	Description and value
E2103	Bottom	U	7	No description in PDM
E2104	Bottom	T	6	No description in PDM
E2105	Bottom	U	7	No description in PDM
E2106	Bottom	T	7	No description in PDM
E2401	Top	C	9	No description in PDM
E2402	Top	C	1	No description in PDM
E2403	Top	N	2	No description in PDM
E2405	Top	T	9	No description in PDM
E2407	Top	N	9	No description in PDM
E2506	Top	T	2	No description in PDM
E6001	Bottom	T	2	No description in PDM
E6003	Bottom	T	2	No description in PDM
E7000	Bottom	U	8	No description in PDM
E7001	Bottom	U	5	No description in PDM
E7501	Bottom	T	9	No description in PDM
E7502	Bottom	T	9	No description in PDM
E7503	Bottom	U	8	No description in PDM
F2000	Top	B	7	SM FUSE FF 2A 32V
G2200	Bottom	C	2	RTC BACKUP CAPAC 311 SIZE FOR
G7500	Bottom	S	4	VCO 3296-3980MHZ 4-BAND
G7501	Bottom	Q	4	VCTCXO 38.4MHZ 2.5V 2MA
L2000	Bottom	B	4	FERR.BEAD 220R/100M 2A 0R05
L2030	Bottom	C	5	FERRITE BEAD 0.6R 600R/100MZ
L2031	Bottom	C	5	FERRITE BEAD 0.6R 600R/100MZ
L2032	Bottom	D	6	CHIP COIL 68NH J Q12/100MHZ
L2033	Bottom	D	5	FERRITE BEAD 0.6R 600R/100MZ
L2034	Bottom	D	5	FERRITE BEAD 0.6R 600R/100MZ
L2035	Bottom	C	5	FERRITE BEAD 0.6R 600R/100MZ
L2102	Bottom	Q	7	CHIP COIL 56N J Q38/200MHZ
L2103	Bottom	Q	8	CHIP COIL 56N J Q38/200MHZ
L2104	Bottom	G	6	CHIP BEAD ARRAY 2X1000R 0R75
L2105	Bottom	O	2	FERR.BEAD 240R/100M 0.4A 0R4
L2106	Bottom	O	2	FERR.BEAD 240R/100M 0.4A 0R4
L2202	Bottom	M	2	FERR.BEAD 220R/100M 2A 0R05
L2207	Bottom	M	5	FERR.BEAD 240R/100M 0.4A 0R4

Item ref	PWB side	X	Y	Description and value
L2208	Bottom	M	5	FERR.BEAD 240R/100M 0.4A 0R4
L2209	Bottom	M	5	FERR.BEAD 240R/100M 0.4A 0R4
L2210	Bottom	M	5	FERR.BEAD 240R/100M 0.4A 0R4
L2211	Bottom	N	5	FERR.BEAD 240R/100M 0.4A 0R4
L2212	Bottom	N	4	FERR.BEAD 240R/100M 0.4A 0R4
L2270	Bottom	L	5	FERR.BEAD 220R/100M 2A 0R05
L2271	Bottom	L	5	FERR.BEAD 220R/100M 2A 0R05
L2272	Bottom	K	4	FERR.BEAD 220R/100M 2A 0R05
L2273	Bottom	K	5	FERR.BEAD 220R/100M 2A 0R05
L2301	Bottom	I	5	FERR.BEAD 220R/100M 2A 0R05
L2302	Bottom	J	5	INDUCT WW 10U 0A65 0R35 4X4X1
L2304	Bottom	J	3	CHOKE 22U M 0R7 0.35A 3.0X3.0
L2305	Bottom	I	3	FERRITE BEAD 0.6R 600R/100MZ
L2306	Bottom	I	3	FERRITE BEAD 0.6R 600R/100MZ
L2402	Bottom	T	4	FERRITE BEAD 0.6R 600R/100MZ
L2403	Bottom	J	2	FERR.BEAD 240R/100M 0.4A 0R4
L2404	Bottom	T	3	FERRITE BEAD 0.6R 600R/100MZ
L2405	Bottom	O	2	FERRITE BEAD 0.6R 600R/100MZ
L3200	Bottom	G	8	FERRITE BEAD 0.6R 600R/100MZ
L3301	Bottom	N	6	FERRITE BEAD 0.6R 600R/100MZ
L3303	Bottom	P	9	INDUCT WW 2.2UH 1A2 0R168 310
L3304	Bottom	O	9	FERRITE BEAD 0.6R 600R/100MZ
L6030	Bottom	Q	2	CHIP COIL 2N7 +-0N3 Q29/800M
L6031	Bottom	Q	2	CHIP COIL 2N7 +-0N3 Q29/800M
L6032	Bottom	Q	2	CHIP COIL 22N J Q28/800MHZ
L6077	Bottom	R	3	FERR.BEAD 240R/100M 0.4A 0R4
L6100	Bottom	G	7	CHIP COIL 47N +-3% Q25/200MHZ
L6101	Bottom	H	6	CHIP COIL 120NH J Q8/100MHZ
L7500	Bottom	S	7	CHIP COIL 12N J Q31/800MHZ
L7501	Bottom	S	7	CHIP COIL 12N J Q31/800MHZ
L7502	Bottom	Q	5	FERRITE BEAD 0.6R 600R/100MZ
L7503	Bottom	Q	9	CHIP COIL 27N J Q27/800MHZ
L7504	Bottom	R	7	CHIP COIL 22N J Q28/800MHZ
L7505	Bottom	R	7	CHIP COIL 22N J Q28/800MHZ
L7515	Bottom	S	5	CHIP COIL 15N J Q30/800MHZ

Item ref	PWB side	X	Y	Description and value
L7561	Bottom	Q	6	CHIP COIL 470NH J 0603
M2100	Bottom	C	8	SMD-VIBRA MOTOR 1.3V 80mA 90
N2030	Bottom	D	6	IC ANALOG SWITCH SPDT LOW THR
N2031	Bottom	C	4	AFAMP TPA4411 2X 80MW 1.8/4.5
N2300	Bottom	J	4	TAHVO v5.2 & v5.3 LF TFBGA84
N2301	Bottom	J	2	WHITE LED DRIVER 4LEDS 500mW
N2401	Bottom	G	5	TRX2+RX4 PEMD9 N 10K/47K 0W
N2600	Bottom	G	9	IRDA 1.15Mbps 2V4
N3200	Bottom	G	8	VREG & LEVELSHIFT(LP3928)USMD
N3300	Bottom	O	9	DC/DC CONV LM3671TLX-1.82V uS
N3301	Bottom	O	7	VREG LP3985ITLX-2.8 NOPB U
N6030	Bottom	P	2	BC4-ROM1.0RDL
N6100	Bottom	H	7	FM RECEIVER TEA5760 N1C
N7505	Bottom	R	6	AHNE401A TRANSCEIVER TFBGA144
N7520	Bottom	R	8	PA RF9282E6.5 GSM/EDGE 850/90
R2007	Bottom	C	3	ASIP SILIC USB OTG / ESD BGA1
R2008	Bottom	C	2	CHIPRES 0W06 220K J
R2033	Bottom	E	5	CHIPRES 0W06 10K J
R2034	Bottom	E	5	CHIPRES 0W06 100R J
R2035	Bottom	D	6	CHIPRES 0W06 100K J
R2036	Bottom	D	6	CHIPRES 0W06 10K J
R2044	Bottom	H	6	CHIPRES 0W06 220R J
R2045	Bottom	E	5	CHIPRES 0W06 2K2 J
R2049	Bottom	D	4	CHIPRES 0W06 15R J
R2050	Bottom	C	4	CHIPRES 0W06 15R J
R2051	Bottom	C	6	ASIP TVS 4-CH BI ESD 14V 15pF
R2052	Bottom	C	4	CHIPRES 0W06 100K J
R2070	Bottom	E	2	NTC RES 0W1 47K J B 4050+-3%
R2071	Bottom	N	2	CHIP VARISTOR VWM14V VC50V
R2072	Bottom	E	5	CHIPRES 0W06 2K2 J
R2074	Bottom	E	5	CHIPRES 0W06 100R J
R2100	Bottom	G	5	ASIP SINGLE ENDED MICROPHONE
R2101	Bottom	H	6	CHIPRES 0W06 220R J
R2102	Top	U	7	CHIPRES 0W06 10R J
R2103	Top	U	7	CHIPRES 0W06 10R J



Item ref	PWB side	X	Y	Description and value
R2104	Bottom	F	5	CHIPRES JUMPER 0R0
R2105	Bottom	F	5	CHIPRES JUMPER 0R0
R2106	Bottom	N	5	CHIP VARISTOR VWM14V VC50V
R2107	Bottom	N	5	CHIP VARISTOR VWM14V VC50V
R2200	Bottom	M	2	CHIPRES 0W06 100K J
R2201	Bottom	N	3	CHIPRES 0W06 120K J
R2202	Bottom	M	5	CHIPRES JUMPER 0R0
R2203	Bottom	M	5	CHIPRES JUMPER 0R0
R2204	Bottom	M	5	CHIPRES JUMPER 0R0
R2205	Bottom	M	5	CHIPRES JUMPER 0R0
R2212	Bottom	L	5	CHIPRES 0W06 470R J
R2213	Bottom	N	3	CHIPRES 0W06 4K7 J
R2216	Bottom	N	3	CHIPRES 0W06 2M2 J
R2250	Bottom	N	2	CHIPRES 0W06 100K J
R2251	Bottom	N	3	CHIPRES 0W06 100K J
R2303	Bottom	I	4	CHIPRES JUMPER 0R0
R2401	Bottom	T	4	CHIPRES 0W06 10K J
R2406	Bottom	N	2	CHIPRES 0W06 27K J
R2418	Bottom	H	5	CHIPRES 0W06 100R J
R2419	Bottom	H	5	CHIPRES 0W06 100R J
R2421	Bottom	K	3	CHIPRES 0W06 33R J
R2422	Bottom	G	5	CHIPRES JUMPER 0R0
R2600	Bottom	H	8	CHIPRES 0W125 4R7 J
R2803	Bottom	L	9	CHIPRES 0W06 100R J
R2804	Bottom	L	9	CHIPRES 0W06 100R J
R2830	Bottom	N	8	CHIPRES JUMPER 0R0
R3000	Bottom	J	6	CHIPRES 0W06 4K7 J
R3002	Bottom	L	9	CHIPRES 0W06 10R J
R3003	Bottom	K	7	CHIPRES 0W06 4K7 J
R3004	Bottom	K	8	CHIPRES 0W06 4K7 J
R3200	Bottom	G	8	ASIP MMC FILTER *** PB-FREE *
R3201	Bottom	H	8	CHIPRES 0W06 100K J
R3202	Bottom	H	8	CHIPRES 0W06 100K J
R3205	Bottom	G	8	CHIPRES 0W06 680R J
R3206	Bottom	H	8	CHIPRES 0W06 1K2 J

Item ref	PWB side	X	Y	Description and value
R3300	Bottom	P	7	CHIPRES 0W06 4K7 J
R3301	Bottom	P	8	CHIPRES 0W06 4K7 J
R3305	Bottom	O	7	CHIPRES JUMPER 0R0
R3306	Bottom	P	8	CHIPRES 0W06 100R J
R3307	Bottom	P	7	CHIPRES 0W06 100R J
R3312	Bottom	I	8	CHIPRES 0W06 1K0 J
R3313	Bottom	I	9	CHIPRES 0W06 1K0 J
R3314	Bottom	O	7	CHIPRES 0W06 47R J
R6005	Bottom	N	3	CHIPRES 0W06 100K J
R6020	Bottom	T	2	CHIPRES JUMPER 0R0
R6030	Bottom	P	3	CHIPRES 0W06 10K J
R6031	Bottom	Q	2	CHIPRES 0W06 10K J
R6032	Bottom	P	2	CHIPRES 0W06 2R2 J
R6034	Bottom	Q	3	CHIPRES 0W06 10K J
R6037	Bottom	Q	2	CHIPRES 0W06 100K J
R6100	Bottom	G	7	CHIPRES 0W06 100K J
R6101	Bottom	G	7	CHIPRES 0W06 10K J
R6102	Bottom	H	7	CHIPRES JUMPER 0R0
R6103	Bottom	G	6	CHIPRES 0W06 22R J
R6104	Bottom	G	7	CHIPRES JUMPER 0R0
R6105	Bottom	G	7	CHIPRES JUMPER 0R0
R7001	Bottom	T	8	CHIPRES JUMPER 0R0
R7002	Bottom	T	9	CHIPRES JUMPER 0R0
R7501	Bottom	R	5	CHIPRES 0W06 2K2 J
R7502	Bottom	S	6	CHIPRES 0W06 10K F
R7503	Bottom	Q	5	CHIPRES 0W06 4K7 J
R7505	Bottom	R	4	CHIPRES 0W06 8K2 F
R7506	Bottom	R	5	CHIPRES 0W06 10R J
R7507	Bottom	S	5	CHIPRES 0W06 10R J
R7508	Bottom	R	4	CHIPRES 0W06 10R J
R7509	Bottom	Q	4	CHIPRES 0W06 22K J
R7510	Bottom	Q	9	CHIPRES 0W06 15R J
R7522	Bottom	Q	8	CHIPRES 0W06 27K J
R7523	Bottom	S	9	CHIPRES JUMPER 0R0
R7560	Bottom	Q	6	CHIPRES 0W06 100R J

Item ref	PWB side	X	Y	Description and value
S2401	Bottom	O	2	SM SW TACT SPST 12V SIDE KEY
S2402	Bottom	S	2	SM SW TACT SPST 12V SIDE KEY
S2403	Top	U	5	SM SW TACT SPST 12V SIDE KEY
T7501	Bottom	R	4	TRANSF BALUN 3800 +/- 550MHZ
T7520	Bottom	S	9	TRANSF BALUN 1800+-100MHZ 2X
V2000	Top	B	4	ASIP TVS BGA4
V2405	Top	G	4	LED WHITE 140MCD 5MA
V2406	Top	G	7	LED WHITE 140MCD 5MA
V2407	Top	B	7	LED WHITE 140MCD 5MA
V2409	Top	B	4	LED WHITE 140MCD 5MA
X1001	Bottom	U	3	CONN BTB 2X12 F P0.4 30V 0.2A
X2000	Bottom	A	7	CONN CHR DIA 2.0MM COMPRESS
X2002	Bottom	B	3	CONN USB 5POL MINI-USB B TYPE
X2030	Bottom	B	5	SMD CONN AUD/VID 4POL 30V 2A,
X2060	Top	A	4	MODULE ID COMPONENT 2.8X1.8X0
X2070	Bottom	O	3	SM BATTERY CONN 3POL SPR 12V
X2700	Bottom	G	3	CONN SIM SM 6POL P2.54 H1.05
X3200	Bottom	E	8	CONN MICRO SD HINGE
X3300	Bottom	P	5	SMIA85 SOCKET
X7000	Bottom	T	8	SM CONN RF JACK 50R 2W 6GHZ
Z2001	Bottom	C	3	FERRITE BEAD 0.6R 600R/100MZ
Z2400	Bottom	H	4	ASIP 10-CH LCD FILTER W/ESD B
Z2401	Top	U	4	ASIP 7-CH LCD FILTER W/ESD BG
Z2402	Bottom	R	2	ASIP 7-CH LCD FILTER W/ESD BG
Z2700	Bottom	H	3	ASIP SIM ESD/EMI FILT 400UM B
Z6030	Bottom	R	2	LTCC FILT 2441.75+-41.75MHZ
Z7001	Bottom	T	8	PHASESHIFTER-60°@1850 GSM850.
Z7002	Bottom	T	9	PHASESHIFTER-60°@1850 GSM850.
Z7501	Bottom	S	7	DUAL RX SAW FILTER 1800/1900
Z7503	Bottom	Q	7	SAW MODULE TX GSM 850/900MHz
Z7504	Bottom	R	7	DUAL RX SAW FILTER 850/900 MH
Z7520	Bottom	S	8	FERRITE BEAD 0R01 28R/100MHZ

## Swap units

**Table 7 Swap phones**

**Note:** For product codes, please refer to the latest Service bulletin.

Swap phones
RM-237 SWAP EURO-C BLACK LATIN
RM-237 SWAP EURO-C FR BLACK LATIN
RM-237 SWAP EURO-C TR BLACK LATIN
RM-237 SWAP EURO-I RU BLACK CYRILLIC
RM-237 SWAP EURO-I UKRAINE BLACK CYRILL.
RM-237 SWAP EURO-F BLACK HEBREW
RM-237 SWAP EURO-H BLACK GREEK
RM-237 SWAP MEA-13 BLACK LATIN
RM-237 SWAP MEA-1 BLACK ARABIC

**Table 8 Lightswap**

**Note:** For product codes, please refer to the latest Service bulletin.

Lightswap
RM-237 LIGHTSWAP ENGINE EURO-C
RM-237 LIGHTSWAP EURO-C FR
RM-237 LIGHTSWAP MEA-13
RM-237 LIGHTSWAP CHINA-Q HONGKONG
RM-237 LIGHTSWAP APAC-P
RM-237 LIGHTSWAP APAC-R
RM-237 LIGHTSWAP APAC-T PHILLIP
RM-237 LIGHTSWAP APAC-U

### Component layout - top (2cba\_31a)

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## **3 — Service Software Instructions**

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## ■ *Phoenix* installation steps in brief

### Prerequisites

Recommended hardware requirements:

- Computer processor: Pentium 700 MHz or higher
- RAM 256 MB
- Disk space 100-300 MB

Supported operating systems:

- *Windows 2000* Service Pack 3 or higher
- *Windows XP* Service Pack 1 or higher

### Context

*Phoenix* is a service software for reprogramming, testing and tuning phones.

*Phoenix* installation contains:

- Service software support for all phone models included in the package
- Flash update package files for programming devices
- All needed drivers for:
  - PKD-1 (DK2) dongle
  - DKU-2 USB cable

**Note:** Separate installation packages for flash update files and drivers are also available, but it is not necessary to use them unless there are updates between *Phoenix* service software releases. If separate update packages are used, they should be used after *Phoenix* and data packages have been installed.

The phone model specific data package includes all changing product specific data:

- Product software binary files
- Files for type label printing
- Validation file for the faultlog repair data reporting system
- All product specific configuration files for *Phoenix* software components

**Note:** *Phoenix* and phone data packages should only be used as complete installation packages. Uninstallation should be made from the *Windows* Control Panel.

To use *Phoenix*, you need to:

### Steps

1. Connect a PKD-1 (DK2) dongle to the computer parallel port.
2. Install *Phoenix*.
3. Install the phone-specific data package.
4. Configure users.
5. Manage connection settings (depends on the tools you are using).
  - Update FPS-10 software

**Note:** There is no need to activate FPS-10.

- Activate SX-4 smart card, if you need tuning and testing functions.

**Note:** When FPS-10 is used only for product software updates, SX-4 smart card is not needed.

## Results

*Phoenix* is ready to be used with FPS-10 flash prommer and other service tools.

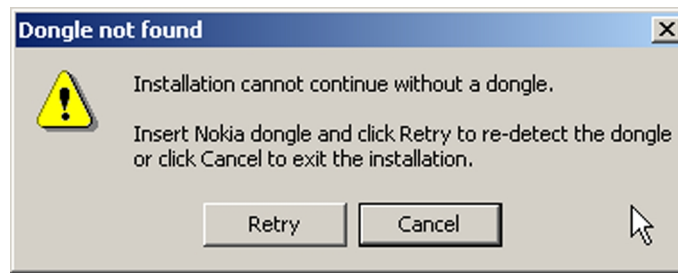
## ■ Installing *Phoenix*

### Prerequisites

- Check that a dongle is attached to the parallel port of your computer.
- Download the *Phoenix* installation package (for example, *phoenix\_service\_sw\_2004\_39\_x\_xx.exe*) to your computer (in *C:\TEMP*, for instance).
- Close all other programs.
- Depending on your operating system, administrator rights may be required to install *Phoenix*.
- If uninstalling or rebooting is needed at any point, you will be prompted by the InstallShield program.

### Context

At some point during the installation procedure, you may get the following message:



**Figure 2 Dongle not found**

This may be a result of a defective or too old PKD-1 dongle.

Check the COM/parallel ports used. After correcting the problem, you can restart the installation.

For more detailed information, please refer to *Phoenix* Help files.

**Tip:** Each feature in *Phoenix* has its own Help function, which can be activated while running the program. Press the **F1** key or the feature's **Help** button to activate a Help file.

### Steps

1. To start the installation, run the application file (for example, *phoenix\_service\_sw\_2004\_39\_x\_xx.exe*).
2. In the *Welcome* dialogue, click **Next**.

3. Read the disclaimer text carefully and click **Yes**.

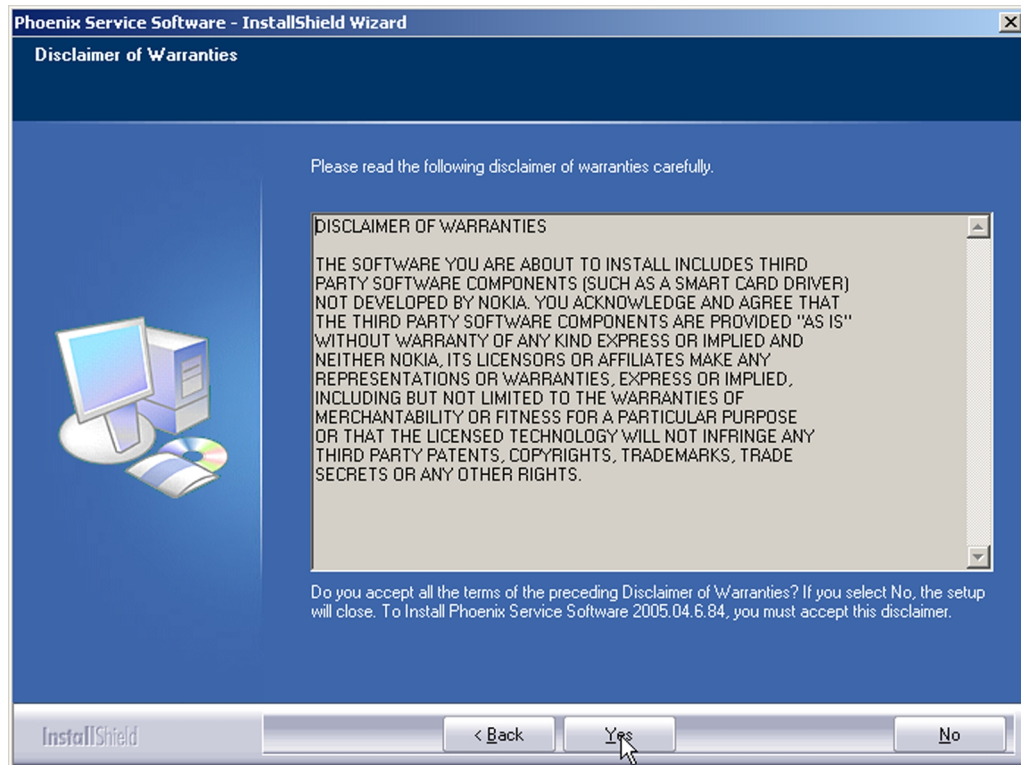


Figure 3 Disclaimer text

4. Choose the destination folder.  
The default folder `C:\ProgramFiles\Nokia\Phoenix` is recommended.
5. To continue, click **Next**.  
To choose another location, click **Browse** (not recommended).
6. Wait for the components to be copied.  
The progress of the installation is shown in the *Setup Status* window.
7. Wait for the drivers to be installed and updated.  
The process may take several minutes to complete.  
If the operating system does not require rebooting, the PC components are registered right away.  
If the operating system requires restarting your computer, the Install Shield Wizard will notify about it.  
Select **Yes...** to reboot the PC immediately or **No...** to reboot the PC manually afterwards.  
After the reboot, all components are registered.  
**Note:** *Phoenix* does not work, if the components have not been registered.

8. To end the installation, click **Finish**.

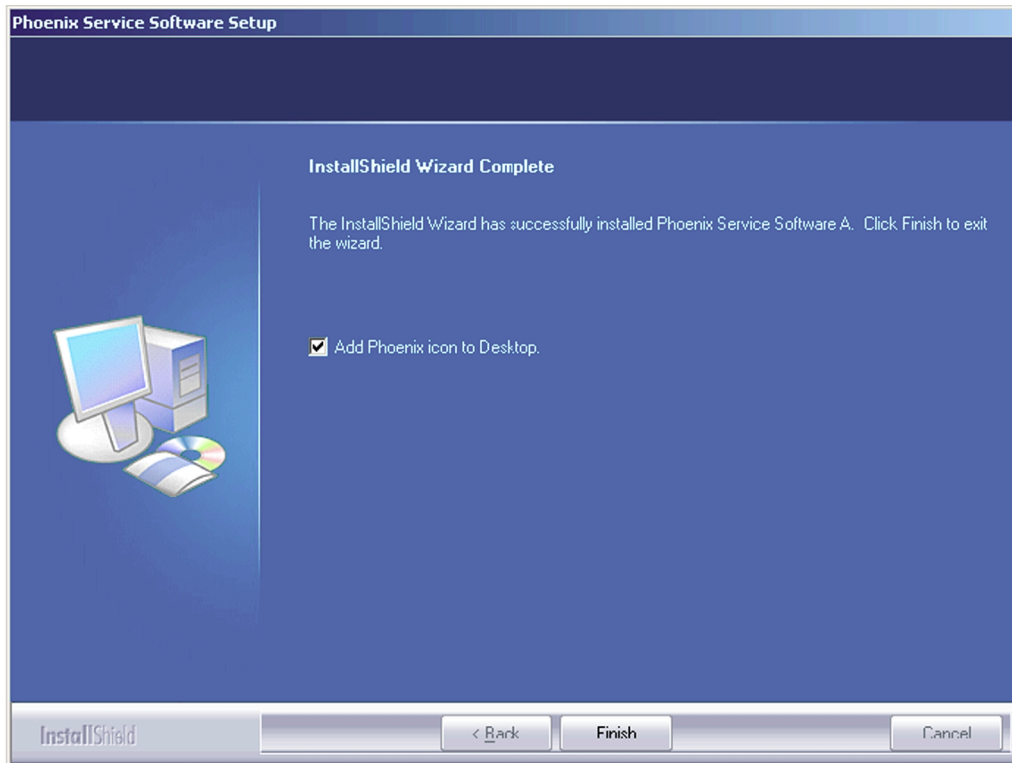


Figure 4 InstallShield Wizard Complete

## Next actions

After the installation, *Phoenix* can be used after:

- installing phone model specific data package for *Phoenix*
- configuring users and connections

FPS-10 flash prommer can be used after updating their flash update package files.

## ■ Updating *Phoenix* installation

### Context

- If you already have the *Phoenix* service software installed on your computer, you need to update the software when new versions are released.
- To update *Phoenix*, you need to follow the same steps as when installing it for the first time.
- When you are updating, for example, from version **a14\_2004\_16\_4\_47** to **a15\_2004\_24\_7\_55**, the update will take place automatically without uninstallation.
- Always use the latest available versions of both *Phoenix* and the phone-specific data package. Instructions can be found in the phone model specific Technical Bulletins and phone data package *readme.txt* files (shown during installation).
- If you try to update *Phoenix* with the same version you already have (for example, **a15\_2004\_24\_7\_55** to **a15\_2004\_24\_7\_55**), you are asked if you want to uninstall the existing version. In this case you can choose between a total uninstallation or a repair installation in a similar way when choosing to uninstall the application from the *Windows* Control Panel.
- If you try to install an older version (for example, downgrade from **a15\_2004\_24\_7\_55** to **a14\_2004\_16\_4\_47**), installation will be interrupted.

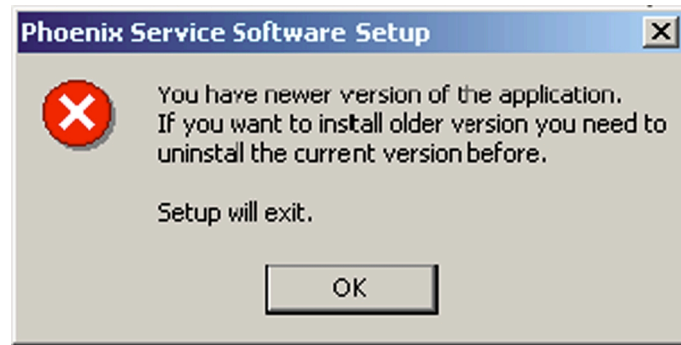


Figure 5 Installation interrupted

- Always follow the instructions on the screen.

## Steps

1. Download the installation package to your computer hard disk.
2. Close all other programs.
3. Run the application file (for example, *phoenix\_service\_sw\_2004\_39\_x\_xx.exe*).

## Results

A new *Phoenix* version is installed and driver versions are checked and updated.

## ■ Uninstalling *Phoenix*

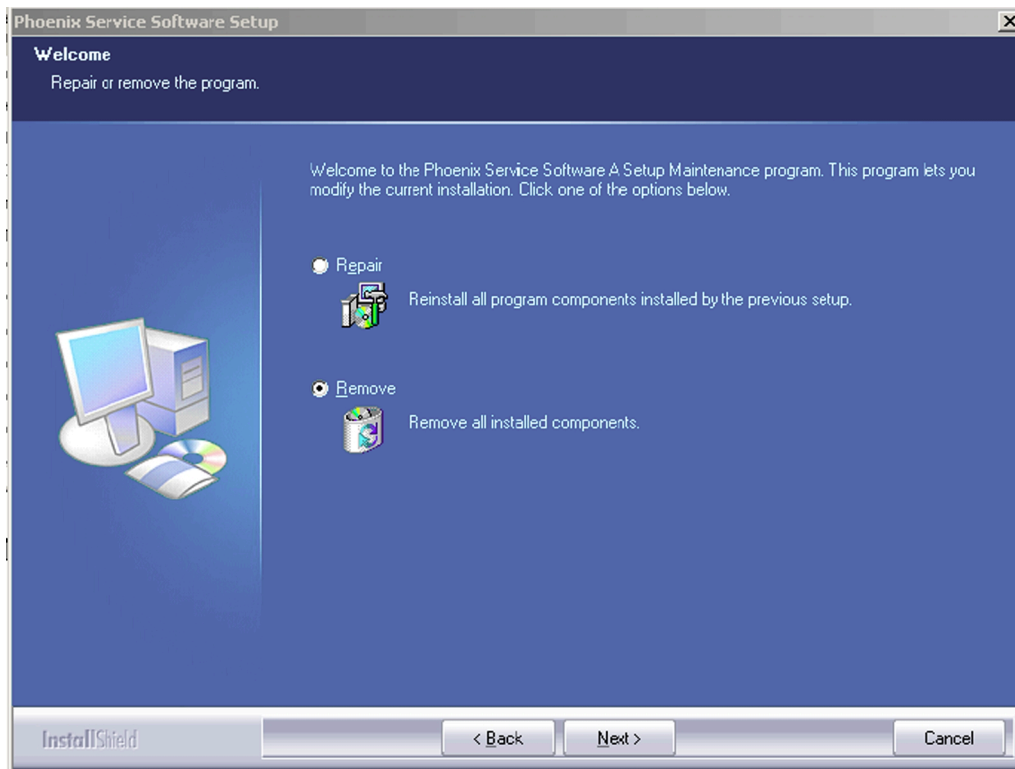
### Context

You can uninstall *Phoenix* service software manually from the *Windows* Control Panel.

### Steps

1. Open the **Windows Control Panel**, and choose **Add/Remove Programs**.

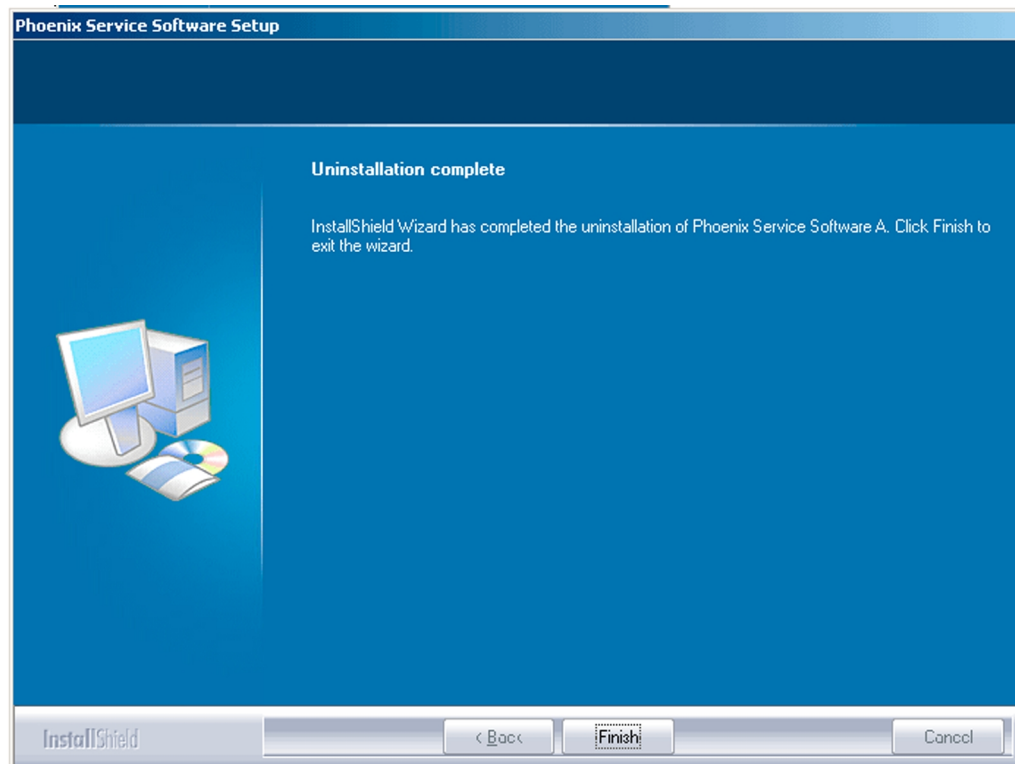
2. To uninstall *Phoenix*, choose **Phoenix Service Software**→**Change/Remove**→**Remove** .



**Figure 6 Remove program**

The progress of the uninstallation is shown.

3. If the operating system does not require rebooting, click **Finish** to complete.



**Figure 7 Finish uninstallation**



If the operating system requires rebooting, InstallShield Wizard will notify you. Select **Yes...** to reboot the PC immediately and **No...** to reboot the PC manually afterwards.

## ■ Repairing *Phoenix* installation

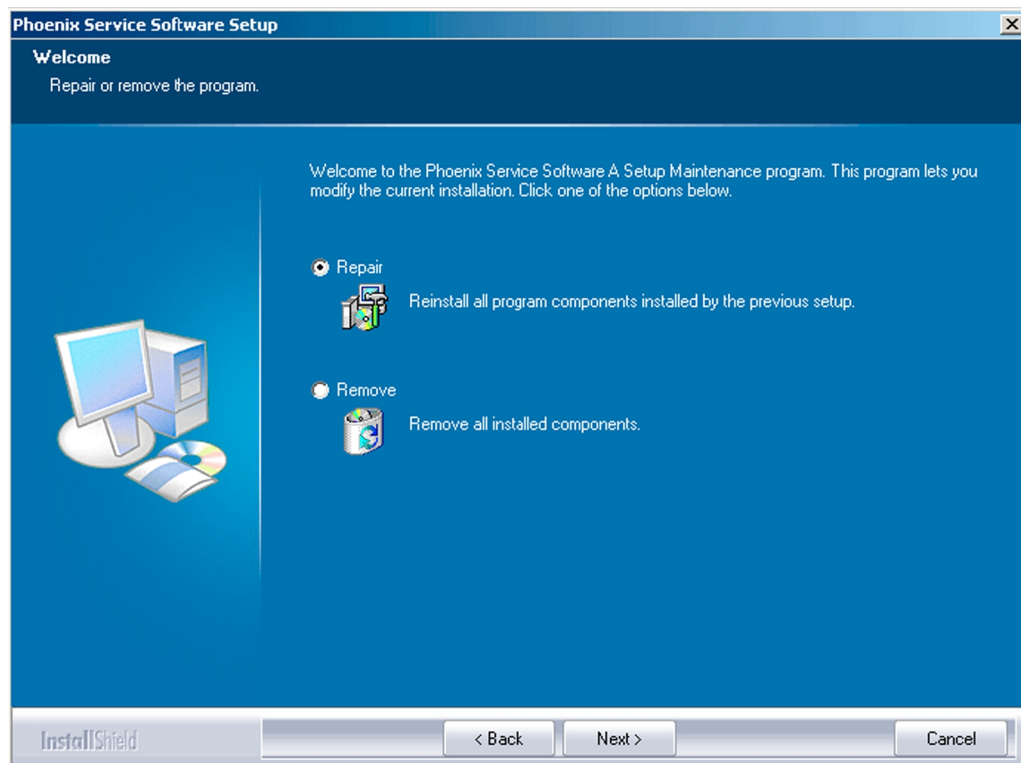
### Context

If you experience any problems with the service software or suspect that files have been lost, use the repair function before completely reinstalling *Phoenix*.

**Note:** The original installation package (for example, *phoenix\_service\_sw\_a15\_2004\_24\_7\_55.exe*) must be found on your PC when you run the repair setup.

### Steps

1. Open **Windows Control Panel**→**Add/Remove Programs** .
2. Choose **Phoenix Service Software**→**Change/Remove** .
3. In the following view, select **Repair**.



**Figure 8 Repair program**

*Phoenix* reinstalls components and registers them.

The procedure is the same as when updating *Phoenix*.

4. To complete the repair, click **Finish**.

## ■ Phone data package overview

Each product has its own data package (DP). The product data package contains all product-specific data files to make the Phoenix service software and tools usable with a certain phone model.

The phone data package contains the following:

- Product software binary files

- Files for type label printing
- Validation file for the fault log repair data reporting system
- All product-specific configuration files for Phoenix software components

Data files are stored in **C:\Program Files\Nokia\Phoenix** (default).

## ■ Installing phone data package

### Prerequisites

- A phone-specific data package contains all data required for the *Phoenix* service software and service tools to be used with a certain phone model.
- Check that a dongle is attached to the parallel port of your computer.
- Install *Phoenix* service software.
- Download the installation package (for example, *XX-XX\_dp\_EA\_v\_1\_0.exe*) to your computer (for example, in C:\TEMP).
- Close all other programs.

(XX-XX = type designator of the product)

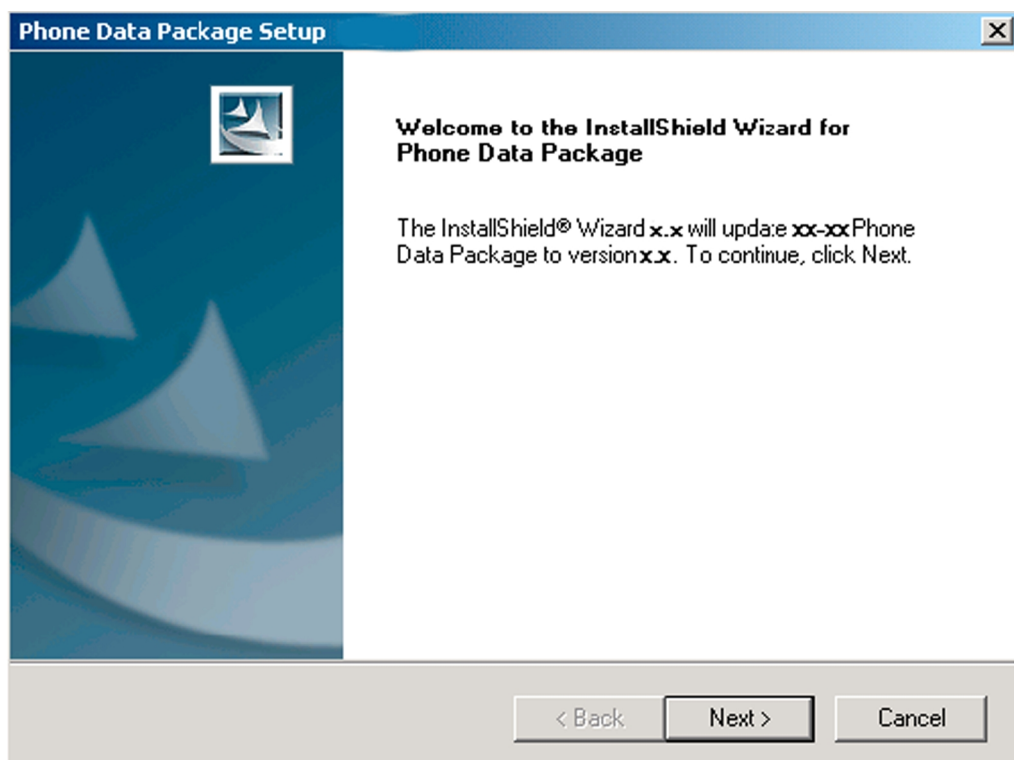
If you already have *Phoenix* installed on your computer, you will need to update it when a new version is released.

**Note:** Often *Phoenix* and the phone-specific data package come in pairs, meaning that a certain version of *Phoenix* can only be used with a certain version of a data package. Always use the latest available versions of both. Instructions can be found in phone-specific Technical Bulletins and *readme.txt* files of data packages.

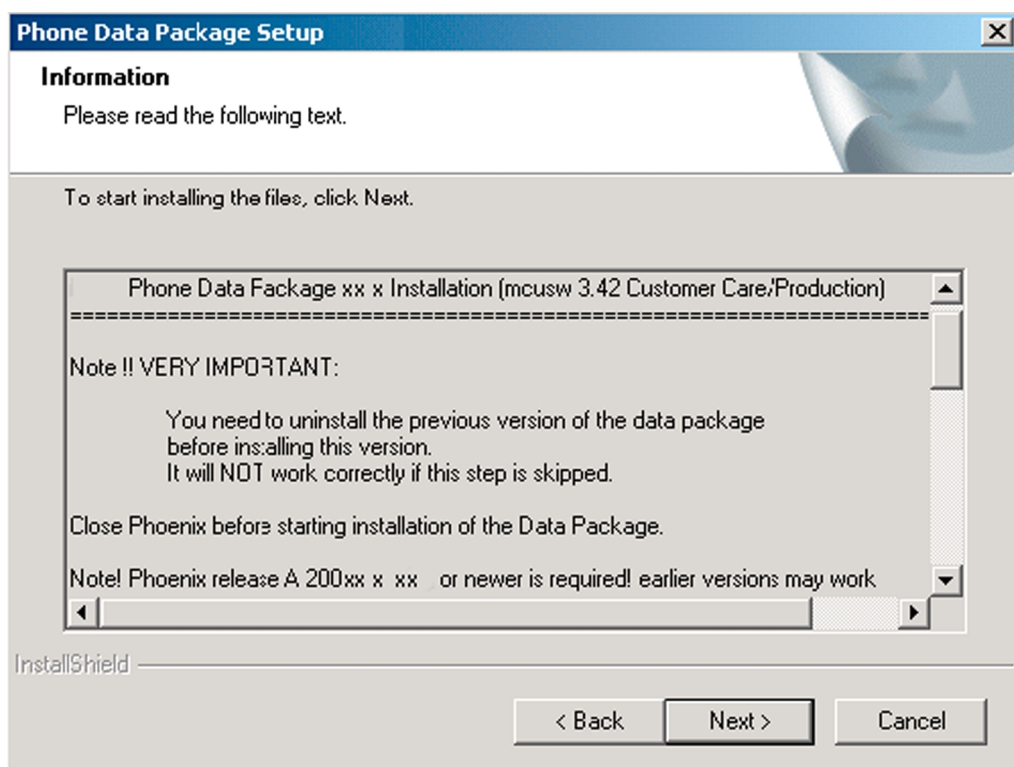
### Steps

1. To start the installation, run the application file (for example, *XX-XX\_dp\_EA\_v\_1\_0.exe*),  
Wait for the installation files to be extracted.

2. Click **Next**.



3. In the following view you can see the contents of the data package. Read the text carefully. There is information about the *Phoenix* version required with this data package.



**Figure 9 Data package setup information**

4. To continue, click **Next**.

5. Choose the destination folder, and click **Next** to continue.

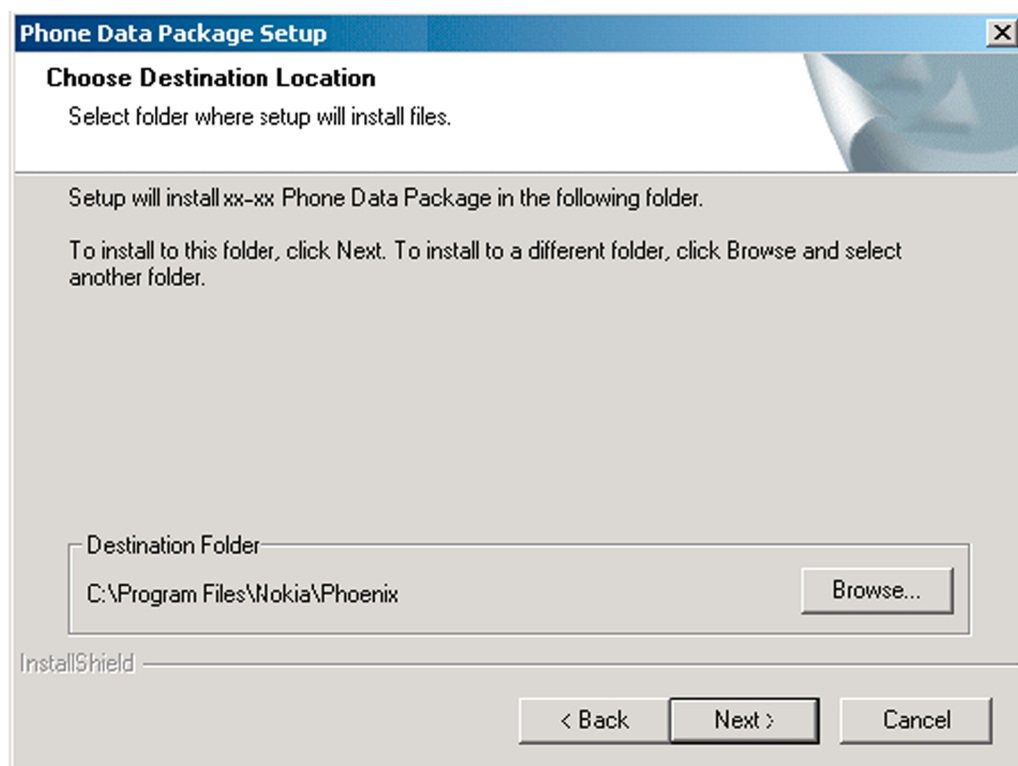
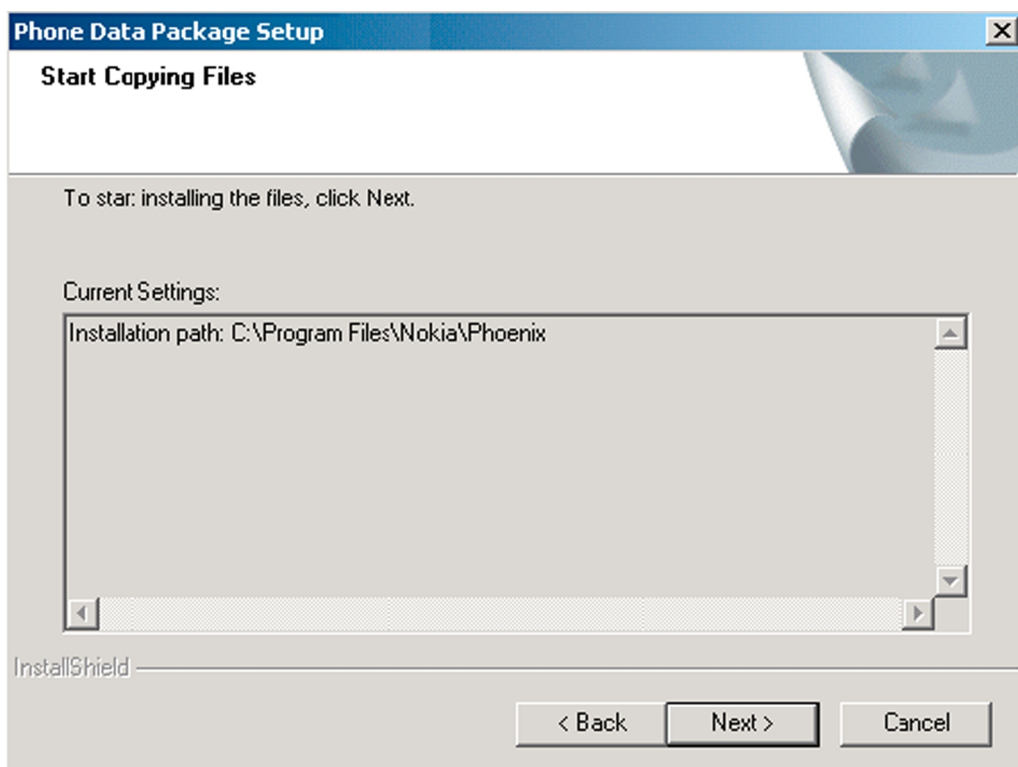


Figure 10 Data package destination folder

The InstallShield Wizard checks where *Phoenix* is installed, and the directory is shown.

6. To start copying the files, click **Next**.



Phone model specific files are installed. Please wait.

7. To complete the installation, click **Finish**.

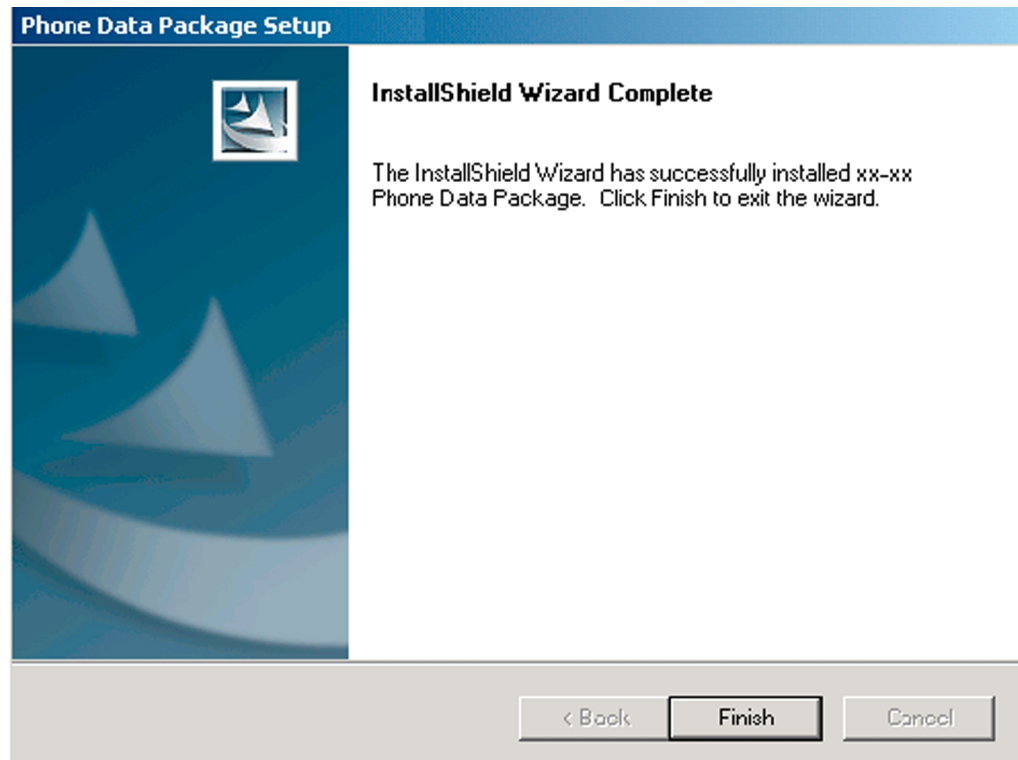


Figure 11 InstallShield Wizard Complete

## Next actions

*Phoenix* can be used for flashing phones and printing type labels after:

- Configuring users
- Managing connections

FPS-10 can be used after updating their flash update package files.

## ■ Uninstalling phone data package

### Context

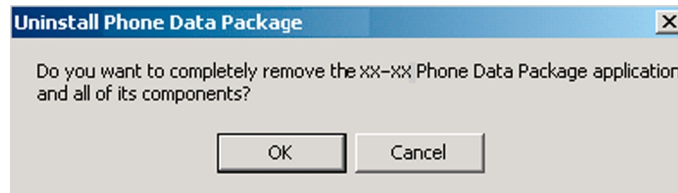
There is no need to uninstall an older version of a data package, unless instructions to do so are given in the *readme.txt* file of the data package and bulletins related to the release.

Please read all related documents carefully.

### Steps

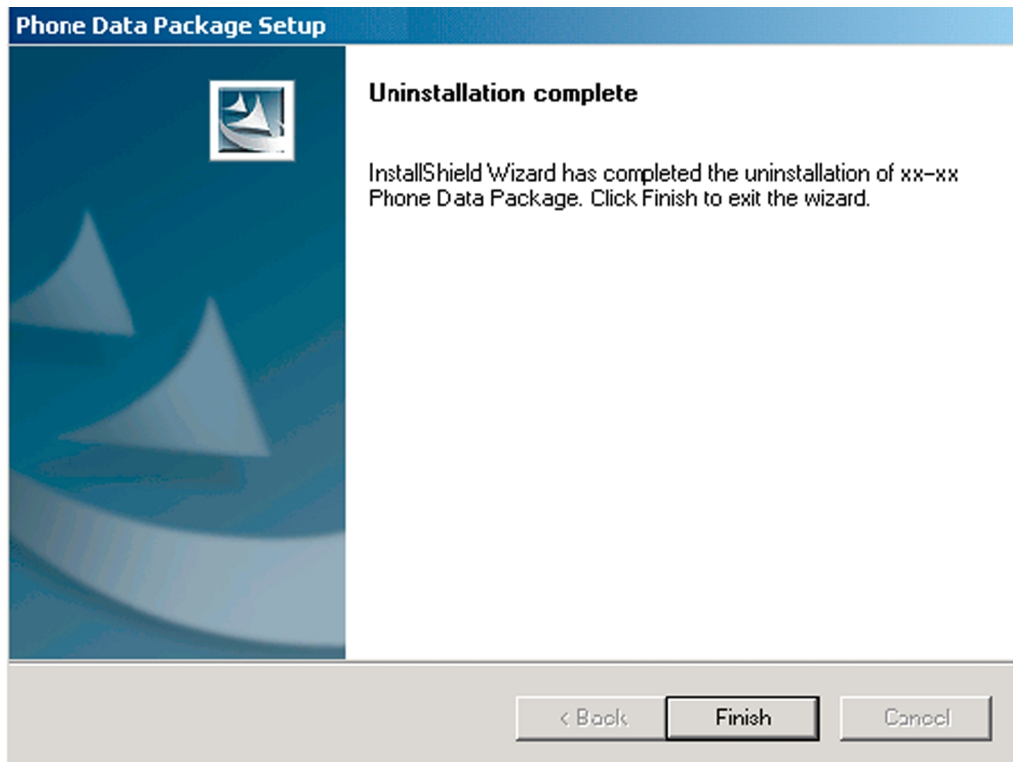
1. Locate the data package installation file (e.g. *XX-XX\_dp\_EA\_v\_1\_0.exe*) from your computer.
2. To start the uninstallation procedure, double-click the data package installation file.

3. To uninstall the data package, click **OK** or to interrupt the uninstallation, click **Cancel**.



**Figure 12 Uninstalling phone data package**

4. When the data package is uninstalled, click **Finish**.



**Figure 13 Finishing data package uninstallation**

### Alternative steps

- You can also uninstall the data package manually from **Control Panel→Add/Remove Programs→xx-xx\* Phone Data Package** . (\*= type designator of the phone).

## ■ Configuring users in *Phoenix*

### Steps

1. Start *Phoenix* service software, and log in.

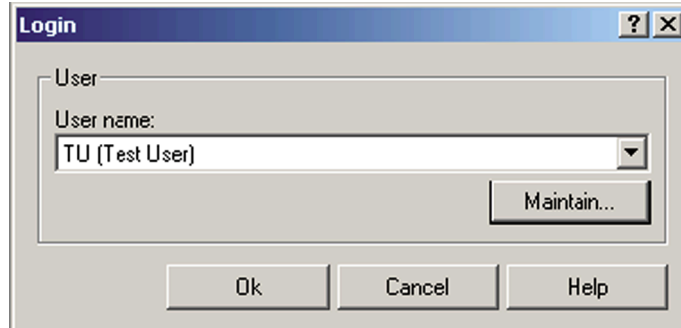


Figure 14 Phoenix login

If the user ID is already configured, select s/he from the *User name* drop-down list, and click **OK**.

2. To add a new user, or to edit existing ones, click **Maintain**.
3. To add a new user, click **New**.
4. Type in the name and initials of the user, and click **OK**.  
The user is added to the user name list.
5. Select the desired user from the *User name* drop-down list, and click **OK**.

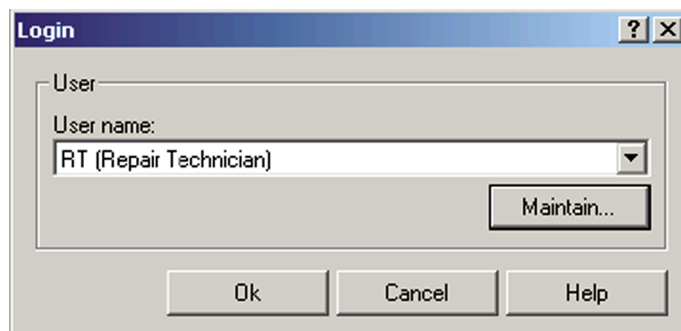


Figure 15 New user configured

## ■ Managing connections in *Phoenix*

### Context

With the **Manage Connections** feature you can edit and delete existing connections or create new ones.

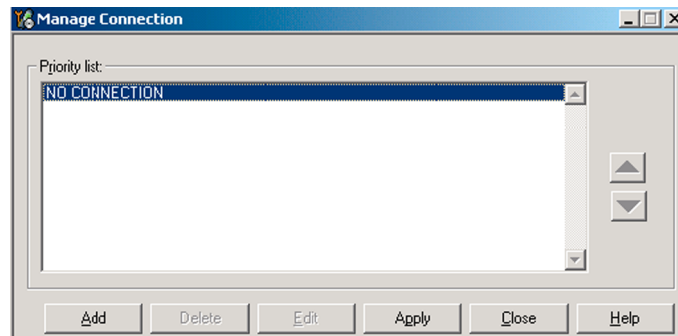
**Note:** After choosing the desired connection, and connecting the phone to a PC for the first time, allow the PC to install the USB device drivers first. Please note that this may take some time to complete.

If there are problems after the driver installation, check that the USB connection is active from the **Windows Control Panel**. If the problem persists, contact the local PC support.

### Steps

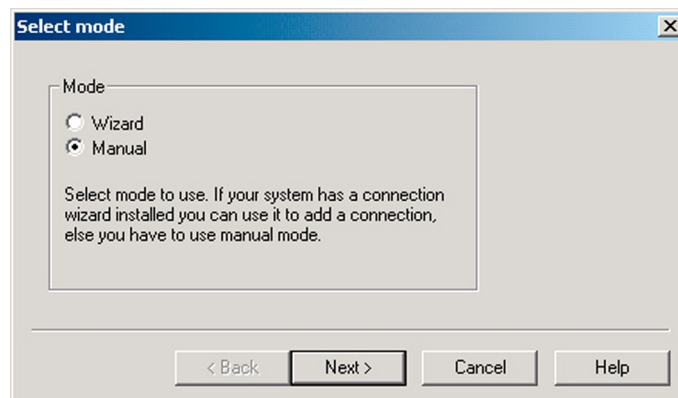
1. Start *Phoenix*, and log in.
2. Choose **File**→**Manage Connections...**

3. To add a new connection, click **Add**.



4. Select **Manual** mode, and click **Next** to continue.

If you want to create the connection using the Connection Wizard, connect the tools and a phone to your PC. The wizard will automatically try to configure the correct connection.



**Figure 16 Select mode: Manual**

- i For an FPS-10 flash prommer with a **USB Connection**, choose the following connection settings:
  - Media: **FPS-10 USB**
  - DEVICE\_INDEX: **0**
  - SERIAL\_NUM: See Serial No from the label attached to the bottom of FPS-10
  - ACTIVE\_MEDIA: **USB**
- ii For an FPS-10 flash prommer with a **LAN connection**, choose the following connection settings:
  - Media: **FPS-10 TCP/IP**
  - NET\_SERV\_NAME: Click **Scan....** Choose your own FPS-10 device based on the correct MAC address. See Serial No from the label attached to the bottom of your FPS-10.
  - PORT\_NUM: Use the default value, and click **Next**.
  - PROTOCOL\_FAMILY: Use the default value, and click **Next**.
  - SOCKET TYPE: Use the default value, and click **Next**.
  - TX\_BUFFER\_SIZE: Use the default value, and click **Next**.
  - RX\_BUFFER\_SIZE: Use the default value, and click **Next**.
- iii For an FPS-8 flash prommer, choose the following connection settings:
  - Media: **FPS-8**
  - PORT\_NUM: COM Port where FPS-8 is connected
  - COMBOX\_DEF\_MEDIA: **FBUS**



iv For a plain **USB connection**, choose the following connection settings:

**Note:** First connect the DKU-2 USB cable between the PC USB port and phone.

- Media: USB

5. To complete the configuration, click **Finish**.

6. Click the connection you want to activate. Use the up/down arrows located on the right hand side to move it on top of the list, then click **Apply**.

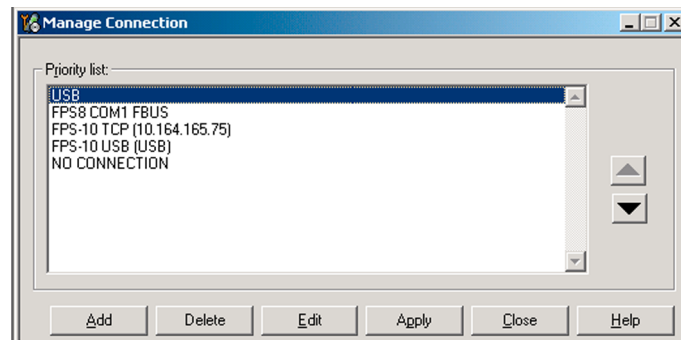


Figure 17 Connections list

The connection is activated, and it can be used after closing the *Manage Connection* window. The connection information is shown at the right hand bottom corner of the screen.



Figure 18 Connection information

7. To use the connection, connect the phone to your PC with correct service tools. Make sure the phone is switched on, and then choose **File**→**Scan Product**.

## Results

The product support module information appears in the status bar:

V 2.0436v19.1, 18-10-04, RM-1, (c) NOKIA. / V 2.39.126, 18-10-04, RM-1, (c)

Figure 19 Product support module information (example from RM-1)

## ■ Installing flash support files for FPS-10

### Prerequisites

**Note:** You need to install flash support files for FPS-10 only, if you don't have the latest Phoenix available or the flash support files have changed after the latest Phoenix release.

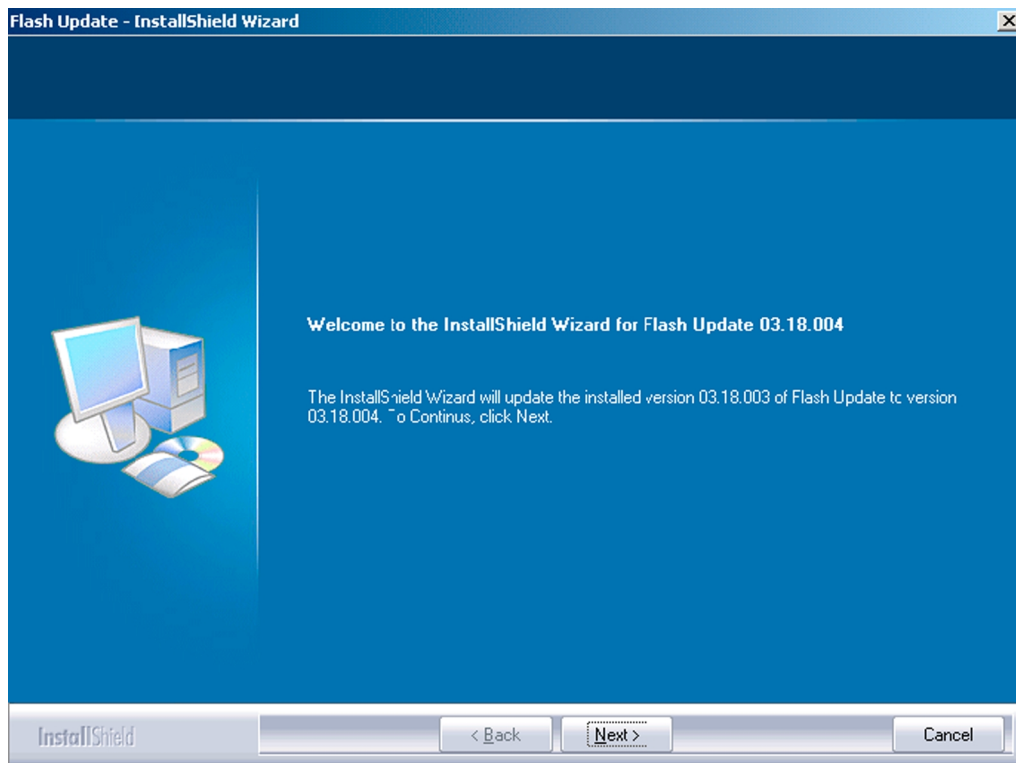
- Flash support files are installed automatically, when you install Phoenix. Use Phoenix packages later than June 2006.
- Normally it is enough to install Phoenix and the phone-specific data package because the Phoenix installation always includes the latest flash update package files for FPS-10.
- A separate installation package for flash support files is available, and the files can be updated according to this instruction, if updates appear between new Phoenix / data package releases

### Context

If you are not using a separate installation package, you can skip this section and continue with updating FPS-10 flash prommer software after installing a new phone data package.

## Steps

1. To begin installation, double-click *flash\_update\_x.yy.exe*.



**Figure 20 Flash update welcome dialog**

- If the same version of Flash Update package already exists, and you want to reinstall it, the previous package is first uninstalled. Restart installation again after that.
2. If you try to downgrade the existing version to older ones, the setup will be aborted. If you really want to downgrade, uninstall newer files manually from **Control Panel** and then rerun the installation again.



**Figure 21 Flash installation interrupted**

If an older version exists on your PC and it needs to be updated, click **Next** to continue installation.

3. It is highly recommended to install the files to the default destination folder *C:\Program Files\Nokia\Phoenix*. Click **Next** to continue.

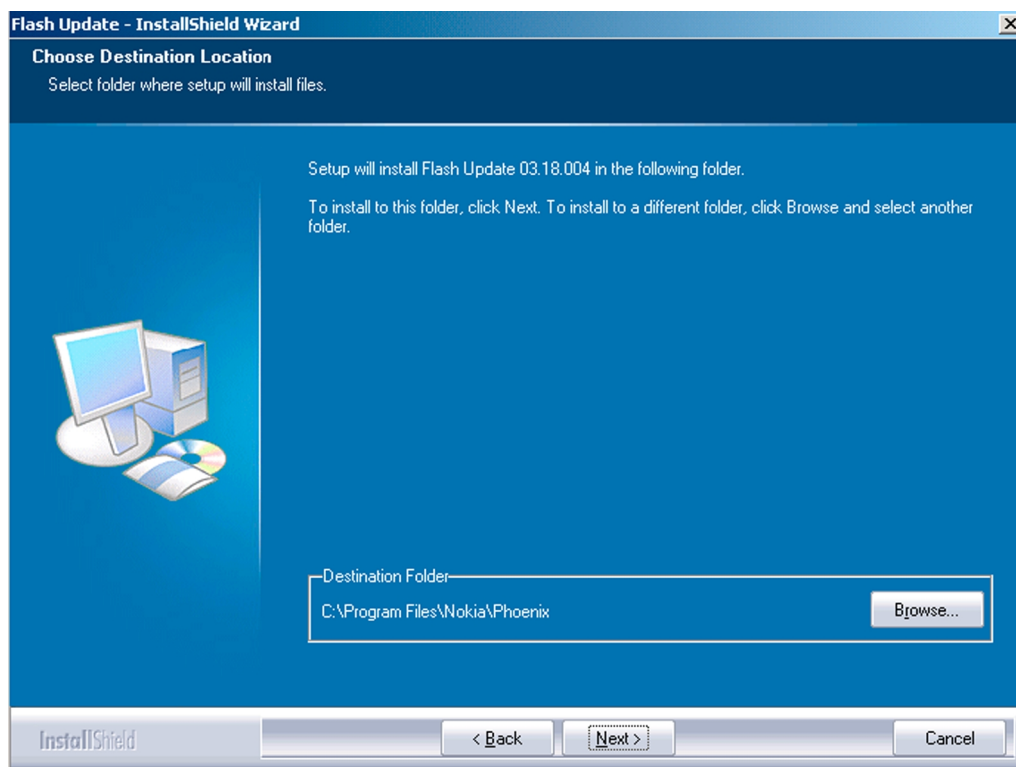


Figure 22 Flash destination folder

When installing the flash update files for the first time you may choose another location by selecting **Browse**. However, this is not recommended.

4. To complete the installation procedure, click **Finish** .

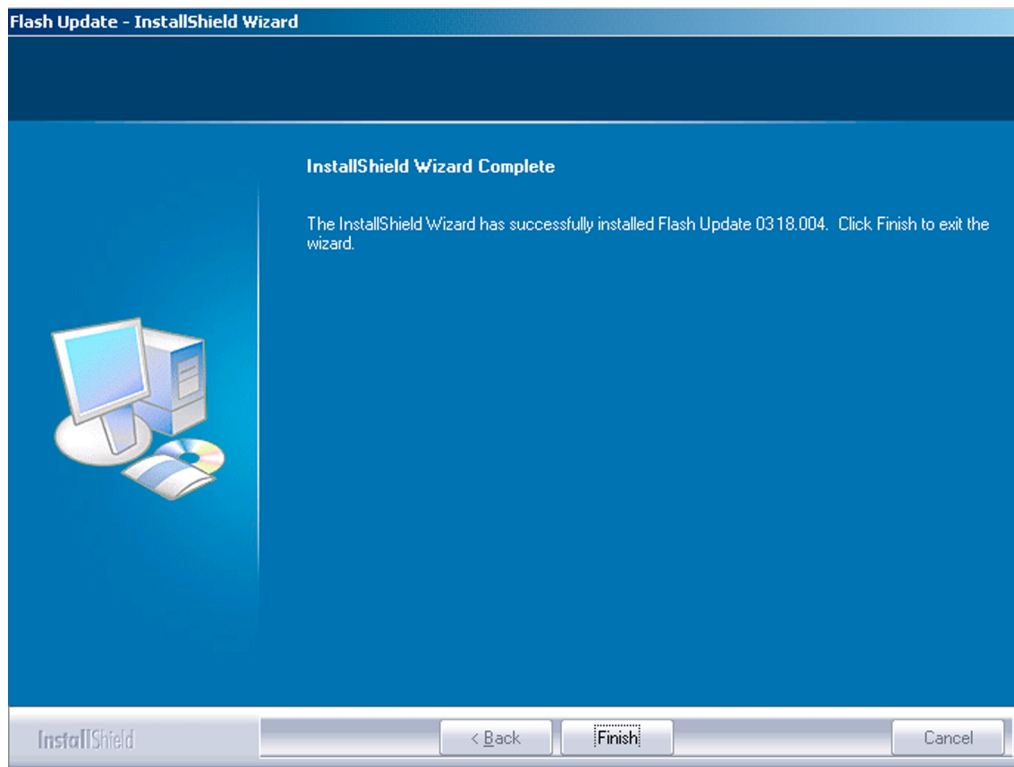


Figure 23 Finish flash update

## Next actions

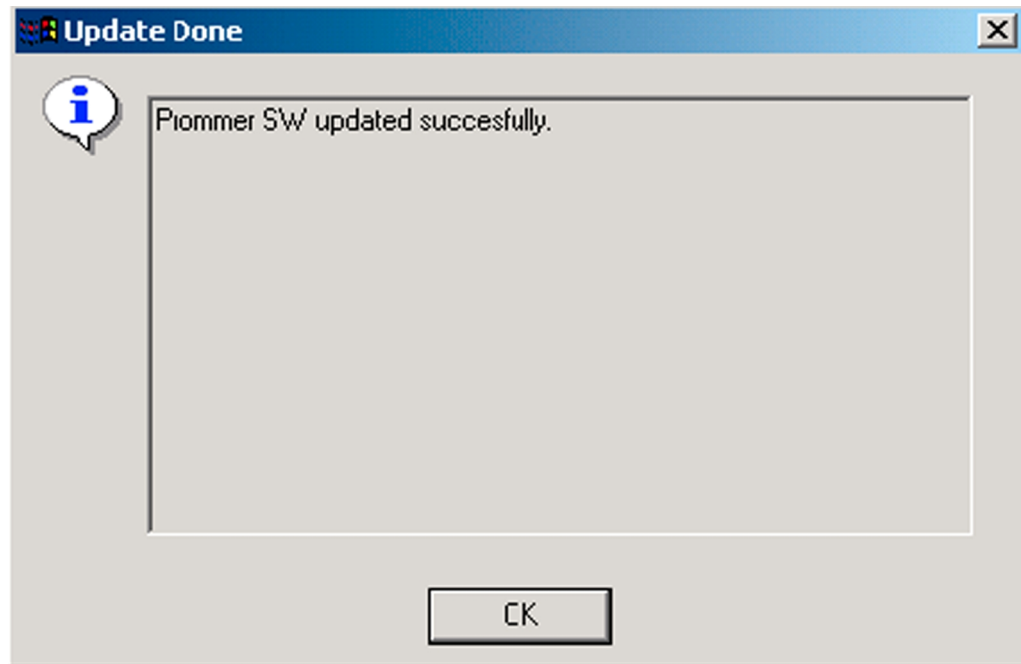
FPS-10 flash prommers must be updated using Phoenix!

## ■ Updating FPS-10 flash prommer software

### Steps

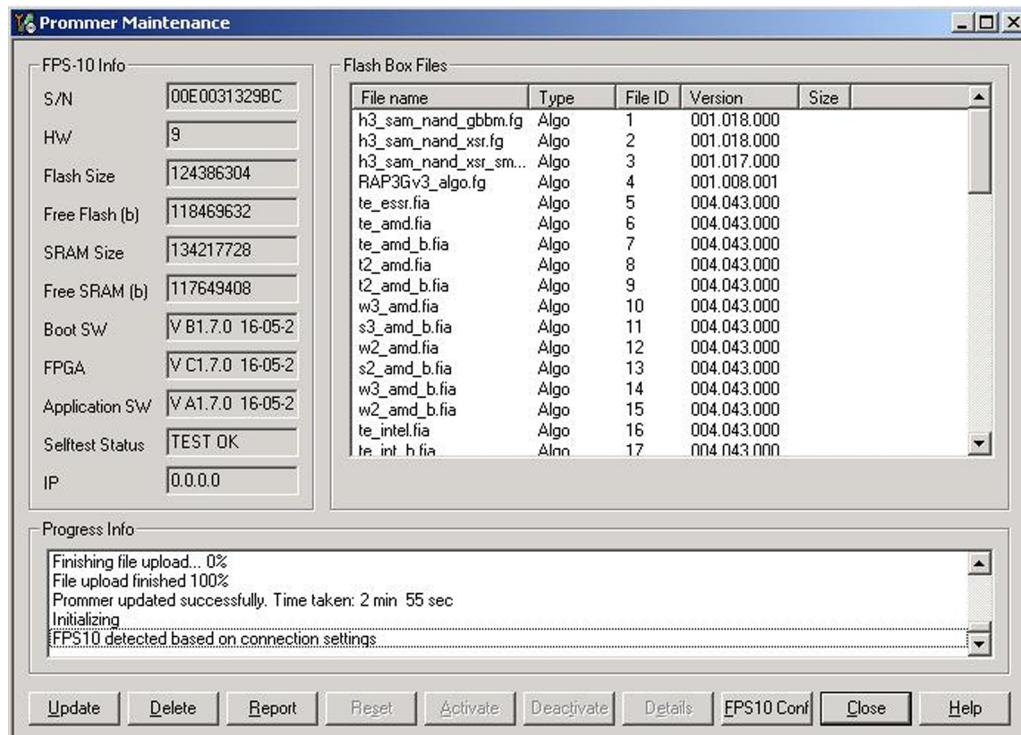
1. Start *Phoenix Service Software* and log in, manage connection correctly for your flash prommer.
2. Choose **Flashing**→**Prommer maintenance** .
3. When the new flash update package is installed to the computer you will be asked to update the files to your Prommer. To update the files, click **Yes**. Click **OK** if the computer informs you about an unsafe removal of the device.
4. Alternatively you can update the FPS-10 flash prommer software by clicking the **Update** button.

5. Wait until you are notified that update has been successful; the procedure will take a couple of minutes. Click **OK** to close the *Update Done* window.



**Figure 24 Prommer SW update finished**

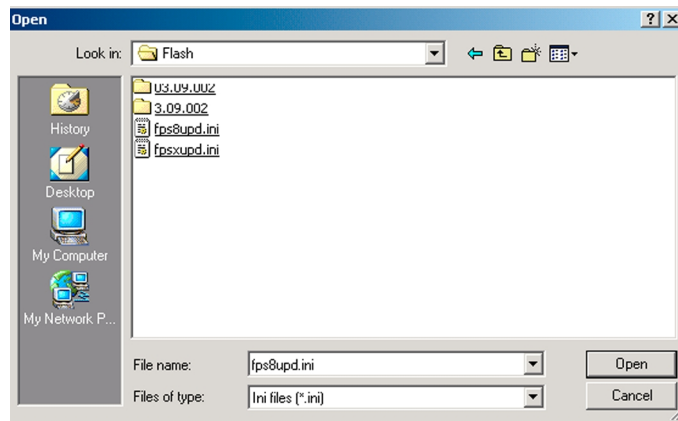
6. If you are using the FPS-10 flash prommer, check that it is detected from the progress info. Check also the status leds in the FPS-10. The MODE2 led (green), VBAT and POWER leds (red) should be lit. If you are using LAN connection, the LAN led (yellow) should be blinking.
7. Check that your FPS-10 flash prommer has enough memory. Flashing the SU-18 with FPS-10 needs at least 128 MB of SRAM memory in the prommer.



**Figure 25 Prommer maintenance window**

## Alternative steps

- You can update FPS-10 SW by clicking the **Update** button and selecting the appropriate fpsxupd.ini file in *C:\Program Files\Nokia\Phoenix\Flash*.



**Figure 26 Flash directory window**

- All files can be loaded separately to the prommer used. To do this, click the right mouse button in the *Flash box files* window and select the file type to be loaded.  
More information can be found in Phoenix **Help**.

## **4 — Service Tools and Service Concepts**

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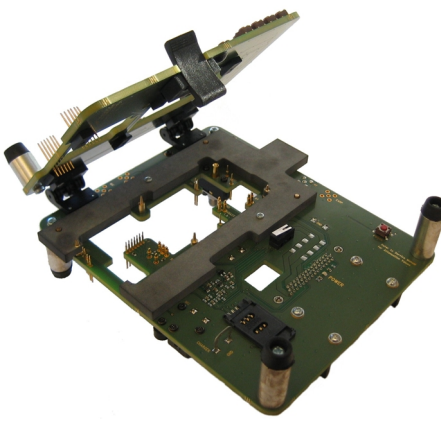

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## ■ Service tools


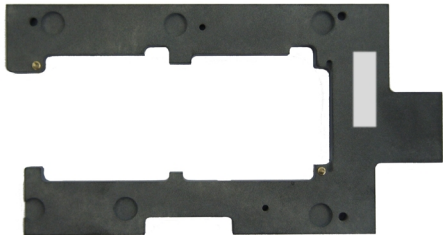
### Product specific tools

The table below gives a short overview of service tools that can be used for testing, error analysis and repair of product RM-237, refer to various concepts.

	FS-47	Flash adapter	
	MJ-122	Module jig	
	RJ-148	Soldering jig	


  




<p>For flashing (also dead phones) with SS-64. RF testing and tuning, and EM calibration on ATO level with SS-62 (mechanical locking concept), CU-4 supported.</p>																							
<p>MJ-122 is meant for troubleshooting, testing, tuning and flashing on the engine level (CU-4 supported). It can only be used in conjunction with the SS-116 adapter.</p> <p>The jig includes an RF interface for GSM and Bluetooth.</p> <p>The following table shows the attenuation values for galvanic RF connection:</p> <ul style="list-style-type: none"> <li> <table border="1"> <thead> <tr> <th>Band</th><th>Tuning channel</th><th>Attenuation RX</th><th>Attenuation TX</th></tr> </thead> <tbody> <tr> <td>GSM850</td><td>190</td><td>0,1</td><td>0,1</td></tr> <tr> <td>GSM900</td><td>37</td><td>0,1</td><td>0,1</td></tr> <tr> <td>GSM1800</td><td>700</td><td>0,15</td><td>0,15</td></tr> <tr> <td>GSM1900</td><td>661</td><td>0,15</td><td>0,15</td></tr> </tbody> </table> </li> </ul>				Band	Tuning channel	Attenuation RX	Attenuation TX	GSM850	190	0,1	0,1	GSM900	37	0,1	0,1	GSM1800	700	0,15	0,15	GSM1900	661	0,15	0,15
Band	Tuning channel	Attenuation RX	Attenuation TX																				
GSM850	190	0,1	0,1																				
GSM900	37	0,1	0,1																				
GSM1800	700	0,15	0,15																				
GSM1900	661	0,15	0,15																				
<p>RJ-148 is a soldering jig used for soldering and as a rework jig for the engine module.</p>																							

	SA-123	RF coupler																																										
	<p>SA-123 is an RF coupler for GSM RF testing. It is used together with the product-specific flash adapter.</p> <p>The following table shows attenuations from the antenna pads of the mobile terminal to the SMA connectors of SA-123:</p> <ul style="list-style-type: none"><li><b>Nokia 3110c (RM-237)</b></li></ul> <table><thead><tr><th>Band</th><th>Channel</th><th>RX Att. (dB)</th><th>Tolerance RX</th><th>TX Att. (dB)</th><th>Tolerance TX</th></tr></thead><tbody><tr><td rowspan="3">EGSM 900</td><td>Low</td><td>3</td><td rowspan="3">+/-1</td><td>4.2</td><td rowspan="3">+/-1</td></tr><tr><td>Mid</td><td>4</td><td>3.5</td></tr><tr><td>High</td><td>5</td><td>4</td></tr><tr><td rowspan="3">GSM 1800</td><td>Low</td><td>3</td><td rowspan="3">+/-1</td><td>4.4</td><td rowspan="3">+/-1</td></tr><tr><td>Mid</td><td>3</td><td>4.3</td></tr><tr><td>High</td><td>4</td><td>3.5</td></tr><tr><td rowspan="3">GSM 1900</td><td>Low</td><td>3</td><td rowspan="3">+/-1</td><td>4.5</td><td rowspan="3">+/-1</td></tr><tr><td>Mid</td><td>4</td><td>4.5</td></tr><tr><td>High</td><td>4</td><td>5</td></tr></tbody></table>			Band	Channel	RX Att. (dB)	Tolerance RX	TX Att. (dB)	Tolerance TX	EGSM 900	Low	3	+/-1	4.2	+/-1	Mid	4	3.5	High	5	4	GSM 1800	Low	3	+/-1	4.4	+/-1	Mid	3	4.3	High	4	3.5	GSM 1900	Low	3	+/-1	4.5	+/-1	Mid	4	4.5	High	4
Band	Channel	RX Att. (dB)	Tolerance RX	TX Att. (dB)	Tolerance TX																																							
EGSM 900	Low	3	+/-1	4.2	+/-1																																							
	Mid	4		3.5																																								
	High	5		4																																								
GSM 1800	Low	3	+/-1	4.4	+/-1																																							
	Mid	3		4.3																																								
	High	4		3.5																																								
GSM 1900	Low	3	+/-1	4.5	+/-1																																							
	Mid	4		4.5																																								
	High	4		5																																								
	SS-116	adaptor frame																																										
	<p>SS-116 Adaptor frame is used with MJ-122 Module Jig.</p> <p>The Module Jig MJ-122 is delivered with an adaptor frame for use with RM-217 and RM-222. The Guiding pins are in different positions for RM-237. Each adaptor frame is marked according to the transceiver type that it can be used with. Remove the existing adaptor frame and replace with SS-116 to enable MJ-122 re-use with RM-237 phones."</p>																																											

## General tools

The table below gives a short overview of service tools that can be used for testing, error analysis and repair of product RM-237, refer to various concepts.

	CU-4	Control unit	
	<p>CU-4 is a general service tool used with a module jig and/or a flash adapter. It requires an external 12 V power supply.</p> <p>The unit has the following features:</p> <ul style="list-style-type: none"> <li>• software controlled via USB</li> <li>• EM calibration function</li> <li>• Forwards FBUS/Flashbus traffic to/from terminal</li> <li>• Forwards USB traffic to/from terminal</li> <li>• software controlled BSI values</li> <li>• regulated VBATT voltage</li> <li>• 2 x USB2.0 connector (Hub)</li> <li>• FBUS and USB connections supported</li> </ul> <p>When using CU-4, note the special order of connecting cables and other service equipment:</p> <p><b>Instructions</b></p> <ol style="list-style-type: none"> <li>1 Connect a service tool (jig, flash adapter) to CU-4.</li> <li>2 Connect CU-4 to your PC with a USB cable.</li> <li>3 Connect supply voltage (12 V)</li> <li>4 Connect an FBUS cable (if necessary).</li> <li>5 Start Phoenix service software.</li> </ol> <div data-bbox="703 1149 1372 1910"> </div> <p><b>Note:</b> Phoenix enables CU-4 regulators via USB when it is started.</p> <p>Reconnecting the power supply requires a Phoenix restart.</p>		

	FLS-4S	Flash device	
	FLS-5	Flash device	
	FPS-10	Flash prommer	

FLS-4S is a dongle and flash device incorporated into one package, developed specifically for POS use.

FLS-5 is a dongle and flash device incorporated into one package, developed specifically for POS use.

FPS-10 interfaces with:




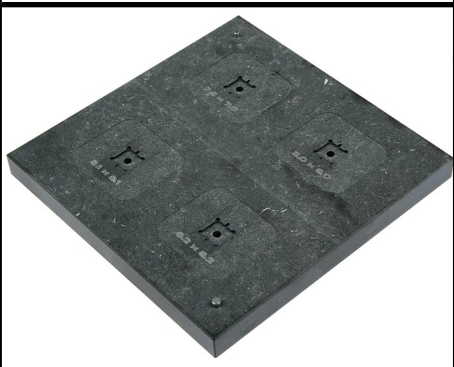
- PC
- Control unit
- Flash adapter
- Smart card

FPS-10 flash prommer features:

- Flash functionality for BB5 and DCT-4 terminals
- Smart Card reader for SX-2 or SX-4
- USB traffic forwarding
- USB to FBUS/Flashbus conversion
- LAN to FBUS/Flashbus and USB conversion
- Vusb output switchable by PC command

FPS-10 sales package includes:



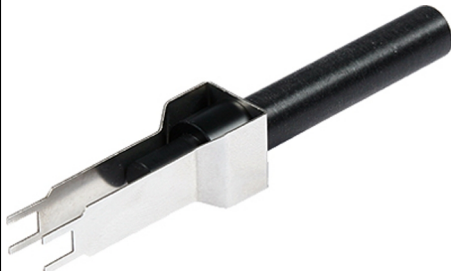

- FPS-10 prommer
- Power Supply with 5 country specific cords
- USB cable

	JBT-9	Bluetooth test and interface box (sales package)	
	PK-1	Software protection key	
	PKD-1	SW security device	
	RJ-93	Rework jig	


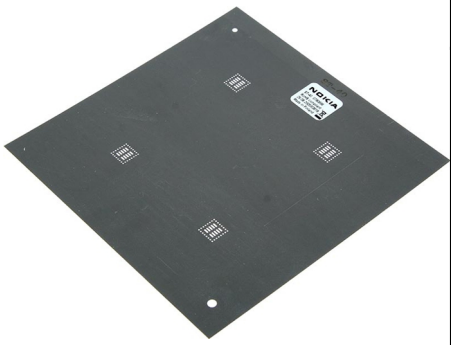

  

<p>The JBT-9 test box is a generic service device used to perform Bluetooth bit error rate (BER) testing, and establishing cordless FBUS connection via Bluetooth. An ACP-8x charger is needed for BER testing and an AXS-4 cable in case of cordless interface usage testing .</p> <p>Sales package includes:</p> <ul style="list-style-type: none"> <li>• JBT-9 test box</li> <li>• Installation and warranty information</li> </ul>			
<p>PK-1 is a hardware protection key with a USB interface. It has the same functionality as the PKD-1 series dongle.</p> <p>PK-1 is meant for use with a PC that does not have a series interface.</p> <p>To use this USB dongle for security service functions please register the dongle in the same way as the PKD-1 series dongle.</p>			
<p>SW security device is a piece of hardware enabling the use of the service software when connected to the parallel (LPT) port of the PC. Without the device, it is not possible to use the service software. Printer or any such device can be connected to the PC through the device if needed.</p>			
<p>RJ-93 is used as a rework jig for the engine module.</p> <p>This stencil takes the front end module (FEM) or power amplifier (PA) module for spreading the soldering paste to the component. Must be used together with the ST-40 stencil.</p>			




	SPS-1	Soldering Paste Spreader	
	SRT-6	Opening tool	
	SRT-6 is used to open phone covers.		
	SS-45	Front camera removal tool	
	The front camera removal tool SS-45 is used to remove/attach the front camera module from/to the socket.		
	SS-46	Interface adapter	
	SS-46 acts as an interface adapter between the flash adapter and FPS-10.		







	SS-62	Generic flash adapter base for BB5	
	<ul style="list-style-type: none"> <li>• generic base for flash adapters and couplers</li> <li>• SS-62 equipped with a clip interlock system</li> <li>• provides standardised interface towards Control Unit</li> <li>• provides RF connection using galvanic connector or coupler</li> <li>• multiplexing between USB and FBUS media, controlled by VUSB</li> </ul>		
	ST-40	rework stencil	
	ST-40 is a rework stencil and used with RJ-93.		
	SX-4	Smart card	
	<p>SX-4 is a BB5 security device used to protect critical features in tuning and testing.</p> <p>SX-4 is also needed together with FPS-10 when DCT-4 phones are flashed.</p>		

## Cables

The table below gives a short overview of service tools that can be used for testing, error analysis and repair of product RM-237, refer to various concepts.

	CA-31D	USB cable	
	The CA-31D USB cable is used to connect FPS-10 or FPS-11 to a PC. It is included in the FPS-10 and FPS-11 sales packages.		

	CA-35S	Power cable	
	DAU-9S	MBUS cable	
	DKE-2	Mini-USB cable	
	PCS-1	Power cable	




CA-35S is a power cable for connecting, for example, the FPS-10 flash prommer to the Point-Of-Sales (POS) flash adapter.

The MBUS cable DAU-9S has a modular connector and is used, for example, between the PC's serial port and module jigs, flash adapters or docking station adapters.

**Note:** Docking station adapters valid for DCT4 products.

USB to mini-USB connector cable.

The PCS-1 power cable (DC) is used with a docking station, a module jig or a control unit to supply a controlled voltage.

	XCS-4	Modular cable	
	XRE-2	Bluetooth cable	
	XRS-6	RF cable	

XCS-4 is a shielded (one specially shielded conductor) modular cable for flashing and service purposes.

The bluetooth cable connects the bluetooth connector of the module jig to the bluetooth test box JBT-9.

The RF cable is used to connect, for example, a module repair jig to the RF measurement equipment.  
SMA to N-Connector approximately 610 mm.

Attenuation for:

- GSM850/900: 0.3+-0.1 dB
- GSM1800/1900: 0.5+-0.1 dB
- WLAN: 0.6+-0.1dB

## ■ Service concepts

### POS (Point of Sale) flash concept

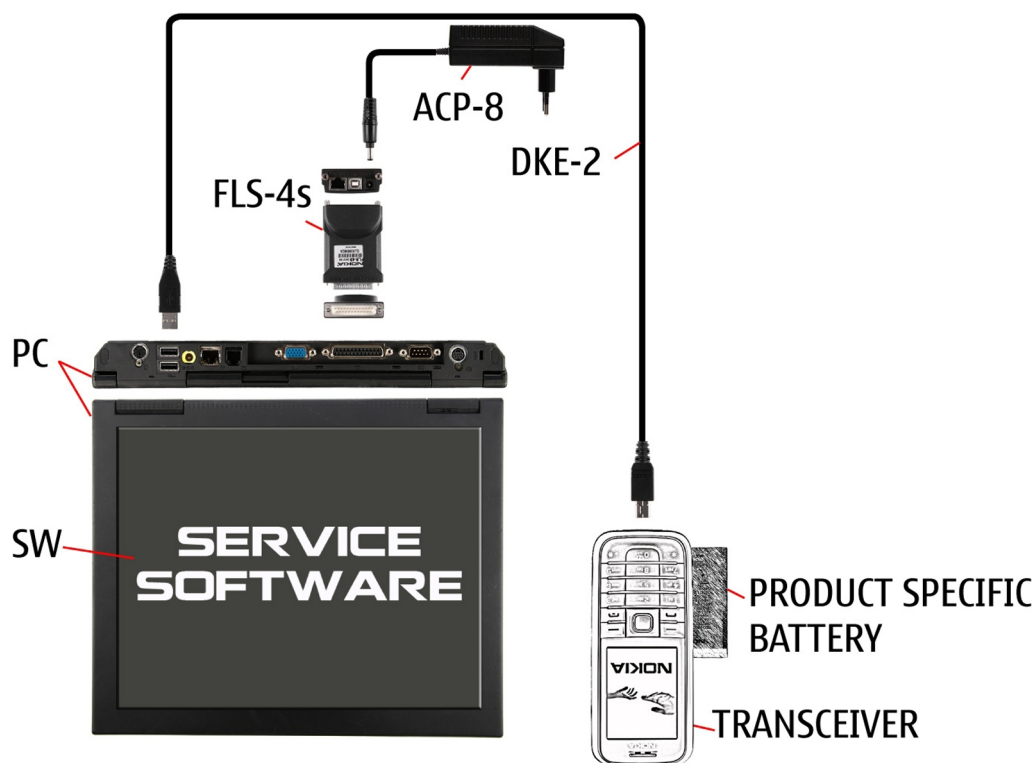


Figure 27 POS flash concept

Type	Description
<b>Product specific tools</b>	
BL-5C	Battery
<b>Other tools</b>	
ACP-8	Power adapter
FLS-4S or FLS-5	POS flash dongle
	PC with Phoenix service software
<b>Cables</b>	
DKE-2	USB connectivity cable

## Flash concept with FPS-10

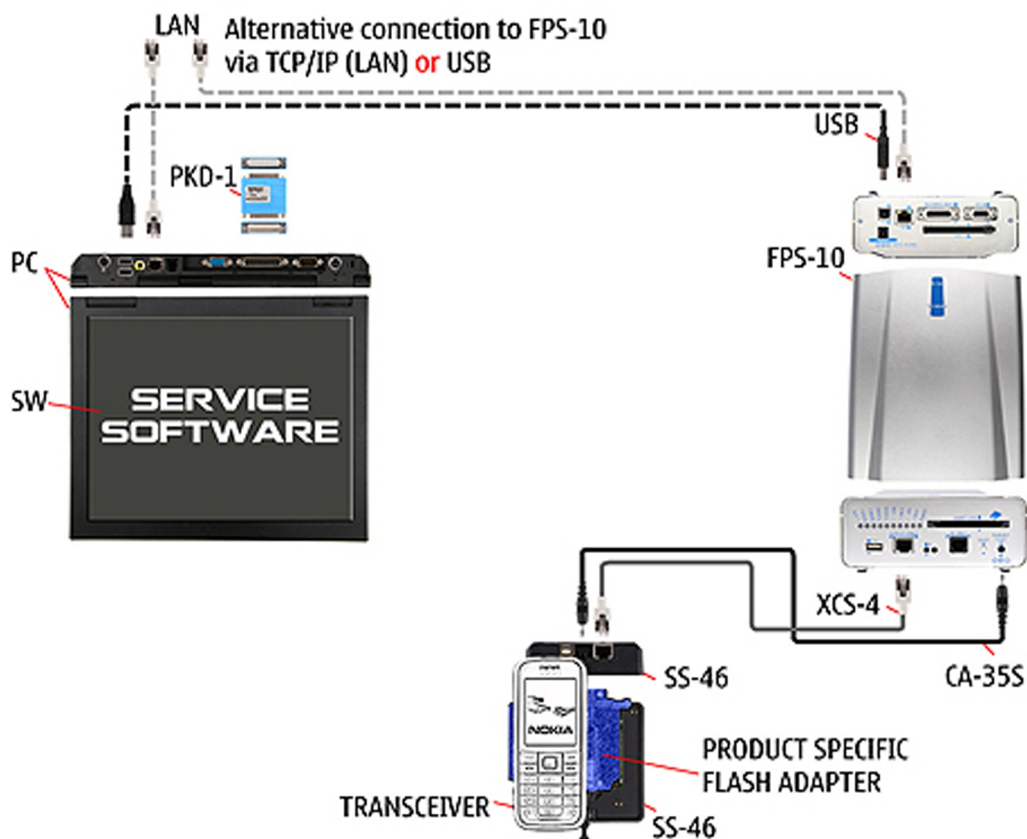


Figure 28 Basic flash concept with FPS-10

Type	Description
<b>Product specific tools</b>	
FS-47	Flash adapter
<b>Other tools</b>	
FPS-10	Flash prommer box
PKD-1/PK-1	SW security device
SS-46	Interface adapter
	PC with Phoenix service software
<b>Cables</b>	
XCS-4	Modular cable
CA-35S	Power cable
	USB cable

## CU-4 flash concept with FPS-10

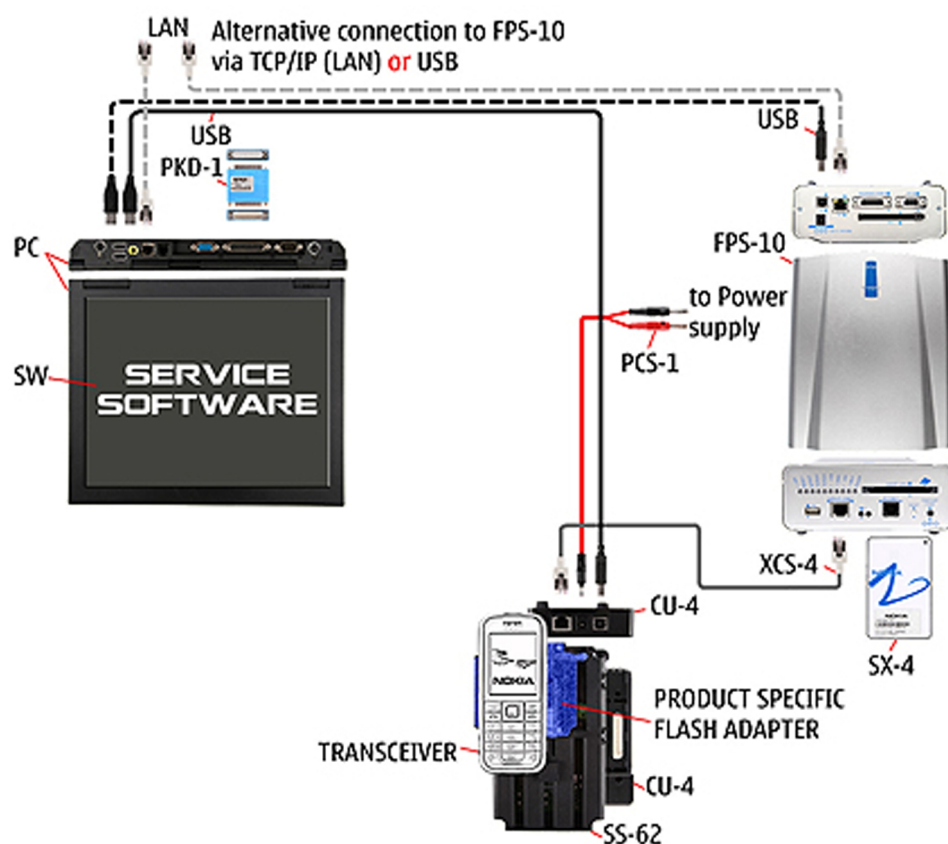


Figure 29 CU-4 flash concept with FPS-10

Type	Description
<b>Product specific tools</b>	
FS-47	Flash adapter
<b>Other tools</b>	
CU-4	Control unit
FPS-10	Flash prommer box
PKD-1/PK-1	SW security device
SS-62	Flash adapter base
SX-4	Smart card
	PC with Phoenix service software
<b>Cables</b>	
PCS-1	Power cable
XCS-4	Modular cable
	Standard USB cable
	USB cable



## Module jig service concept

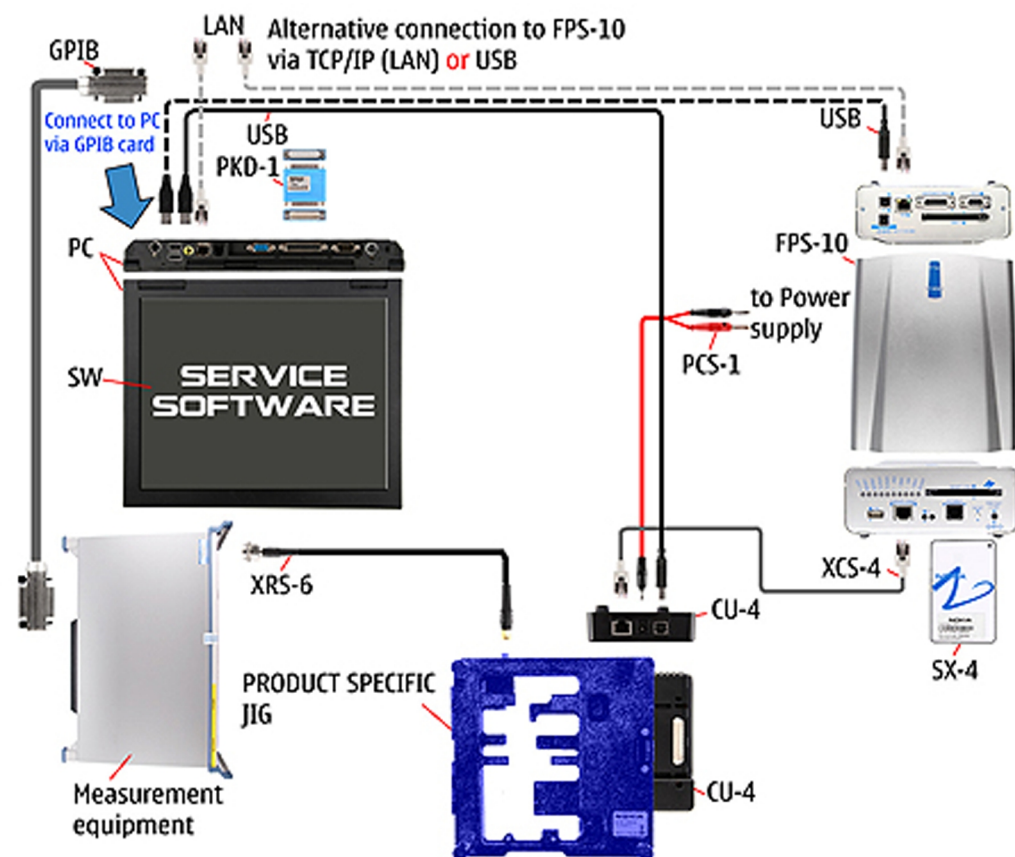


Figure 30 Module jig service concept

Type	Description
<b>Phone specific tools</b>	
MJ-122	Module jig
<b>Other tools</b>	
CU-4	Control unit
FPS-10	Flash prommer box
PKD-1/PK-1	SW security device
SX-4	Smart card
	PC with Phoenix service software
	Measurement equipment
<b>Cables</b>	
PCS-1	DC power cable
XCS-4	Modular cable
XRS-6	RF cable
	USB cable

Type	Description
	GPIB control cable

### RF testing concept with RF coupler

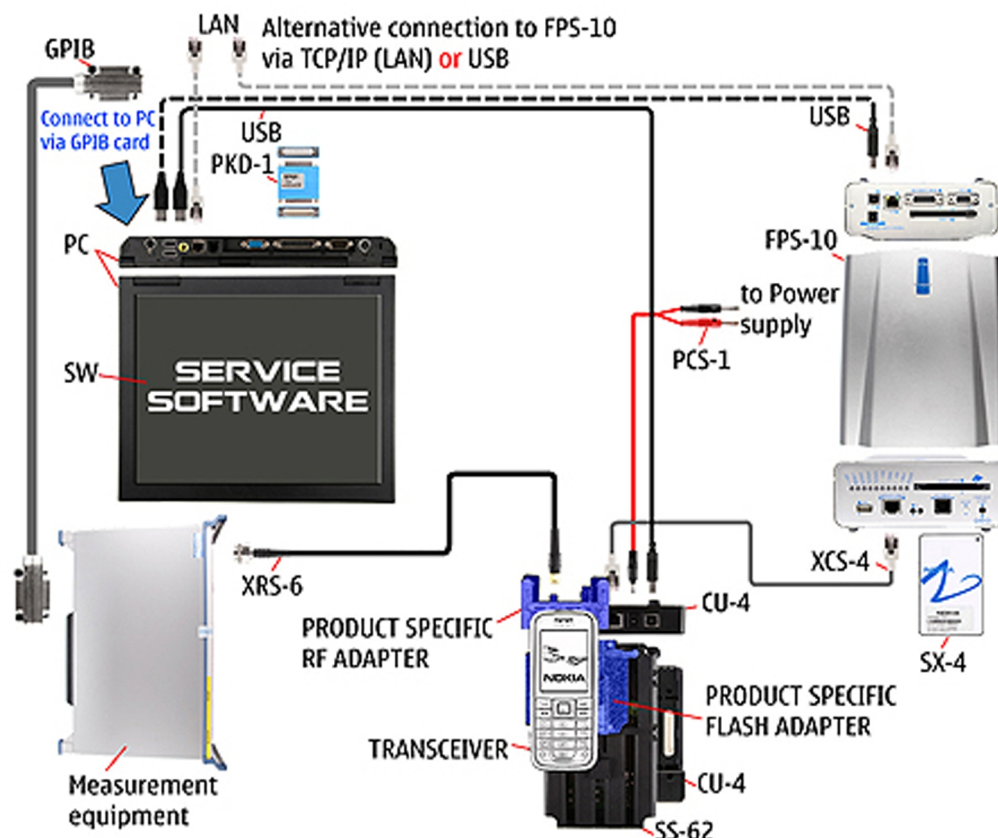


Figure 31 RF testing concept with RF coupler

Type	Description
<b>Product specific tools</b>	
FS-47	Flash adapter
SA-123	RF coupler
<b>Other tools</b>	
CU-4	Control unit
SX-4	Smart card
FPS-10	Flash prommer box
PKD-1/PK-1	SW security device
SS-62	Flash adapter base
	Measurement equipment
	PC with Phoenix service software
<b>Cables</b>	
PCS-1	Power cable



Type	Description
XCS-4	Modular cable
XRS-6	RF cable
	GPIB control cable
	USB cable

### Service concept for RF testing and RF/BB tuning

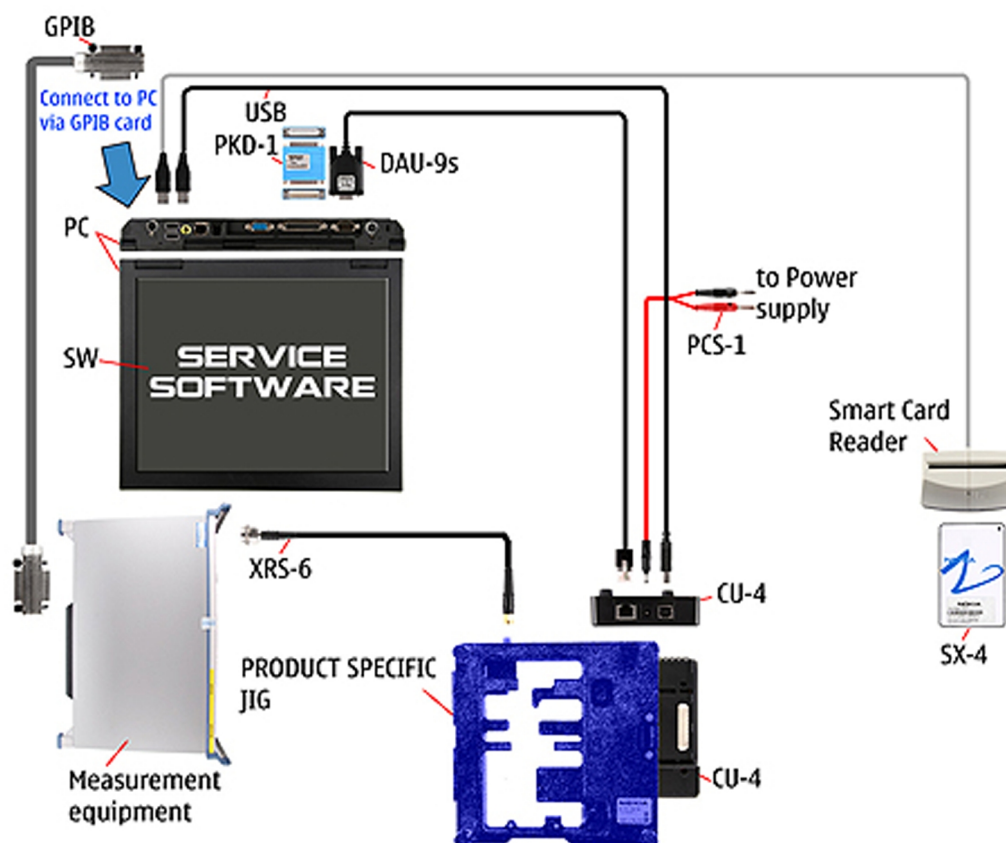


Figure 32 Service concept for RF testing and RF/BB tuning

Type	Description
<b>Product specific tools</b>	
MJ-122	Module jig
<b>Other tools</b>	
CU-4	Control unit
PKD-1/PK-1	SW security device
SX-4	Smart card
	Measurement equipment
	Smart card reader
	PC with Phoenix service software

Type	Description
<b>Cables</b>	
DAU-9s	MBUS cable
PCS-1	DC power cable
XRS-6	RF cable
	GPIB control cable
	USB cable

## **5 — Disassembly and reassembly instructions**

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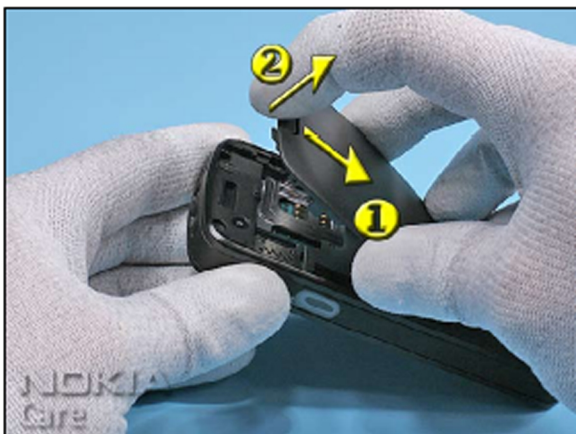
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## ■ Disassembly instructions



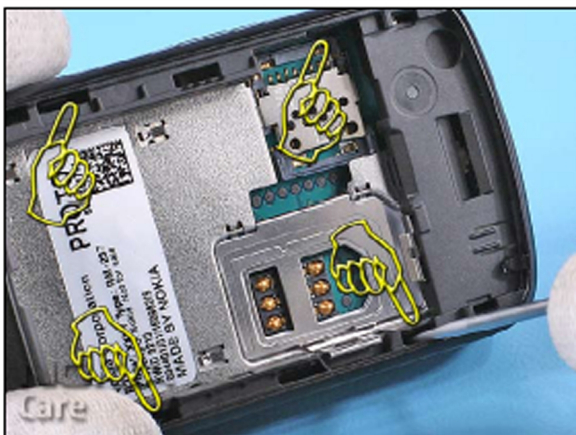
1. Needed tools: A Torx driver, a Torx Plus® size 6 bit, a torque driver, the SS-93 opening tool, a dental pick, flat bladed screwdriver, metal tweezers, the SS-45 camera opening tool, the SRT-6 and the DC plug.



2. Unlock and open the C-COVER ASSEMBLY.



3. First unlock the A-COVER with the SRT-6 at the lower side and lift it a bit.



4. Release the marked clips with the flat bladed screwdriver...

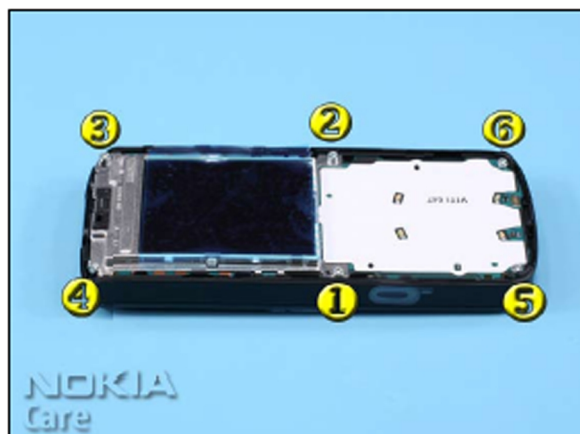


5. ...and then, carefully separate the A-COVER from the unit by slightlying the SRT-6 along the edges of the cover.



6. Remove the Keymat and discard the A-COVER.

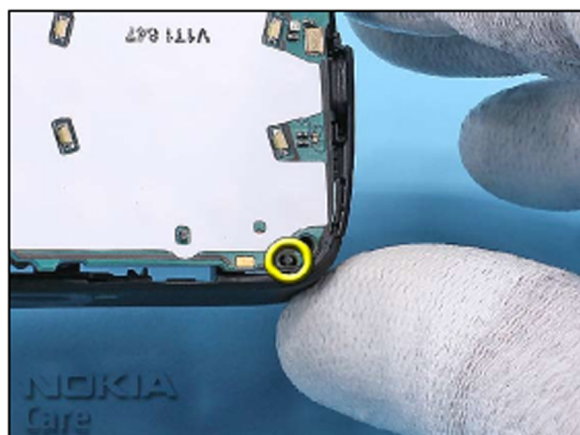




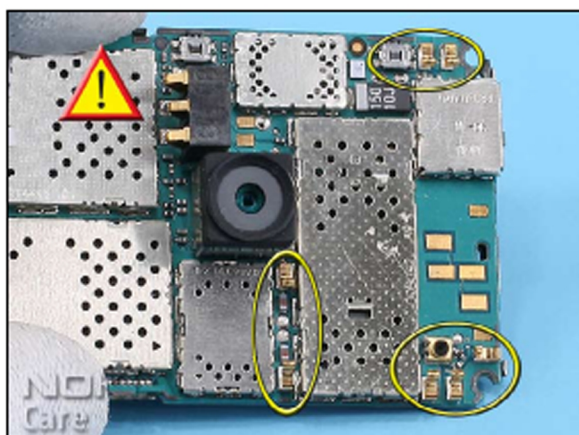
7. Unlock the screws in the order shown.



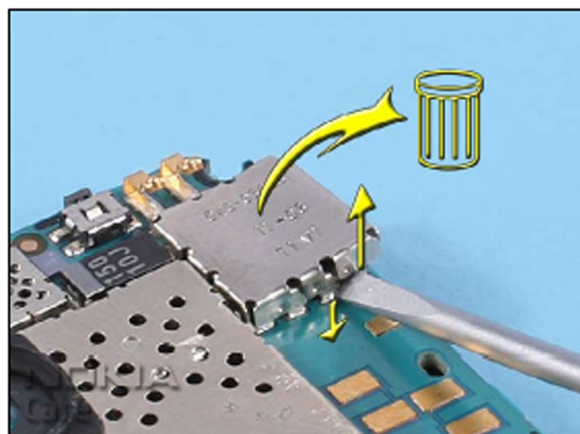
8. Lift the Engine Module a bit as shown.



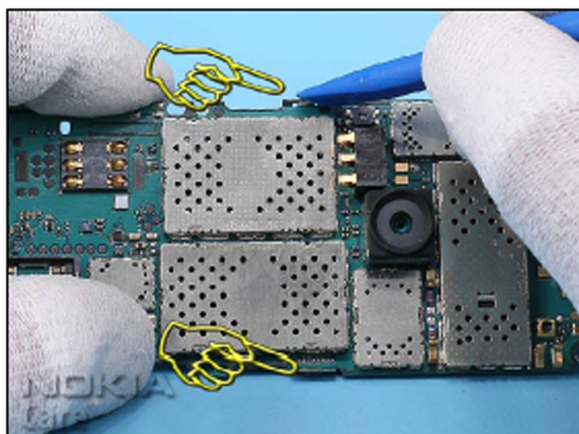
9. Gently, remove the ENGINE MODULE. Avoid damaging the guide pin of the B-COVER.



10. Take a special care to the spring contacts on the ENGINE MODULE.



11. Use a flat bladed screwdriver to open the FLEX SHIELDING LID. Do not touch the spring contacts with the tool. Discard the FLEX SHIELDING LID after removal.

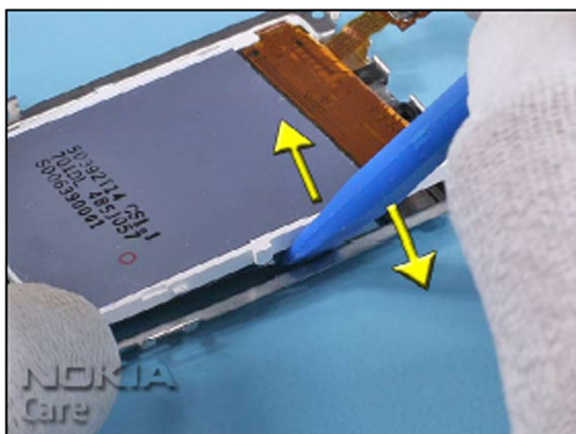


12. Unlock the UI-SHIELD ASSY.

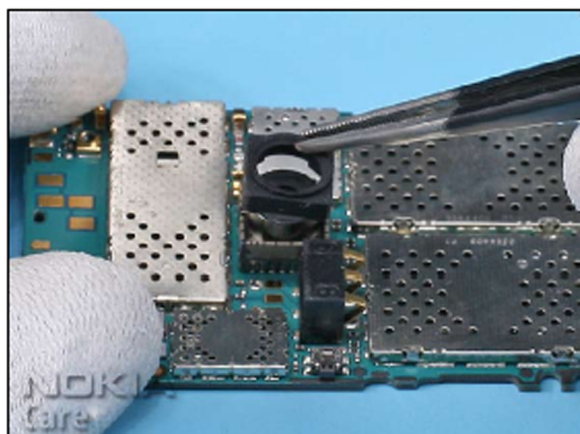




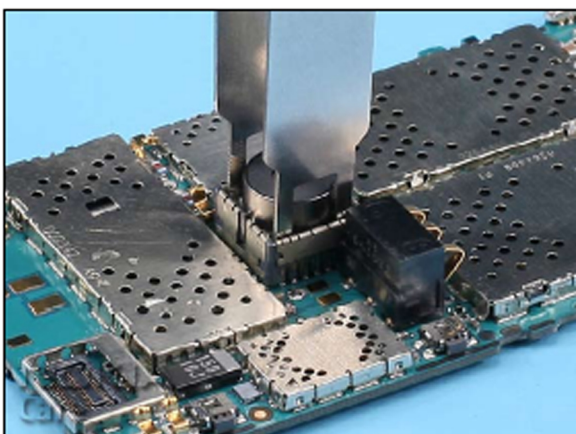
13. Turn the UI-SHIELD ASSY to the position shown and carefully open the LCD connector.



14. Unlock and remove the LCD from the UI-SHIELD ASSY.



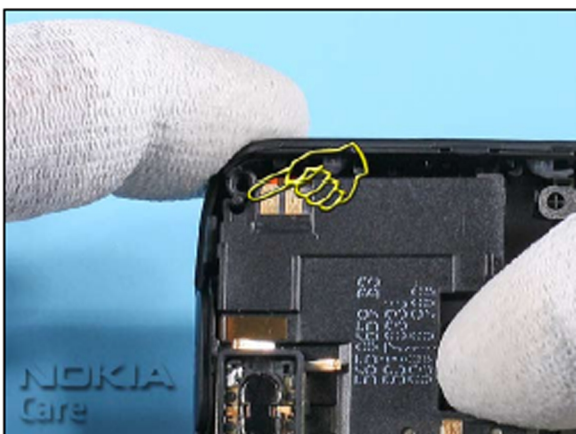
15. Remove the CAMERA GASKET.



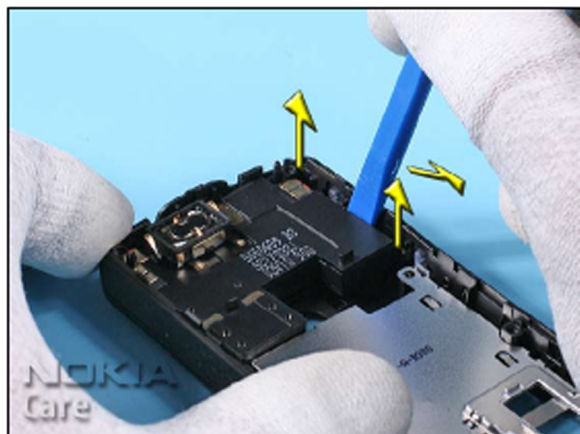
16. Remove the CAMERA with the SS-45.



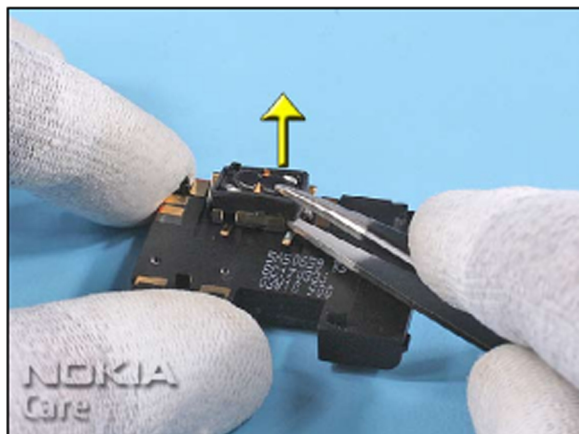
17. Remove the USB DOOR.



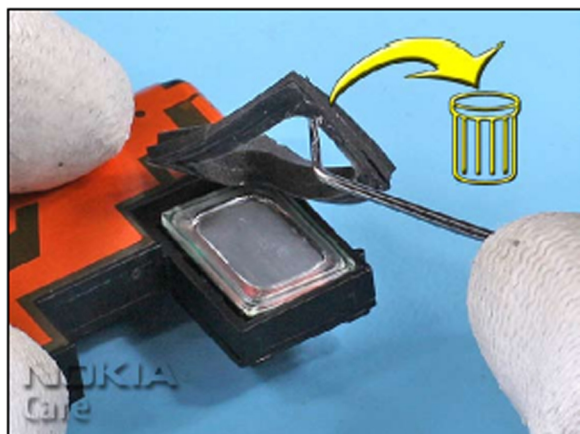
18. Take care to the guide pin when removing the ANTENNA MODULE ASSY.



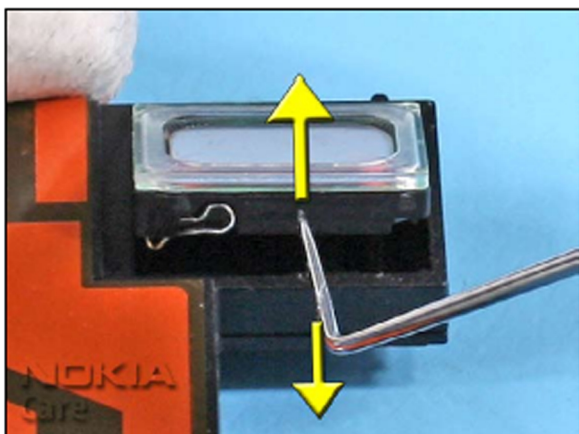
19. Use the SS-93 as a lever to remove the ANTENNA MODULE ASSY.



20. Remove the EARPICIE ASSEMBLY.



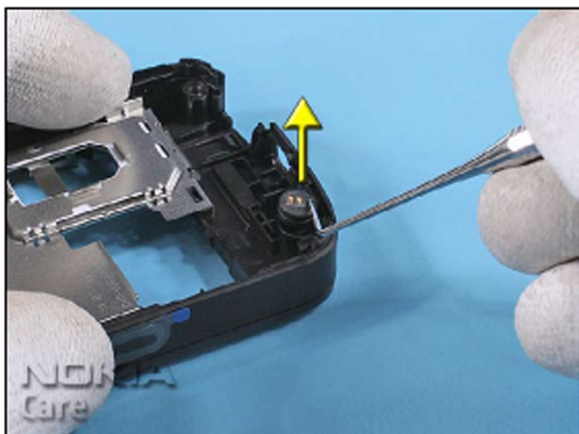
21. Use the dental pick to remove the IHF GASKET. Discard the IHF GASKET after removal.



22. Lift the IHF SPEAKER from its guidance and remove it.



23. Use the DC plug to remove the DC-JACK.



24. Remove the MICROPHONE with the dental pick.





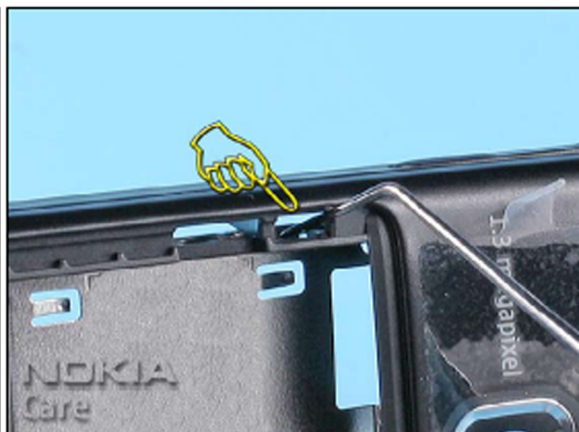
25. Open the SIM door...



26. ...and unlock the LABEL COVER ASSY beginning at the shown side.



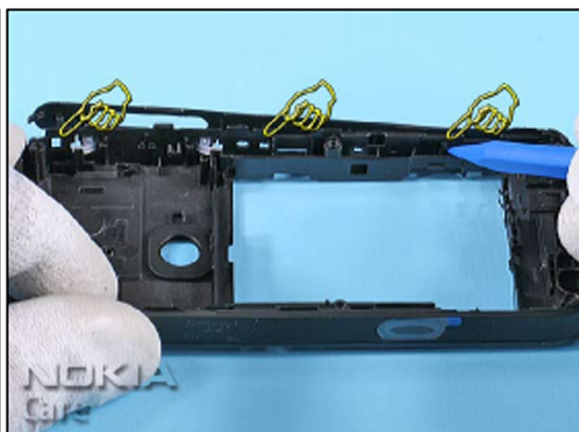
27. Turn the B-COVER and release the three snaps in front of SIM door.



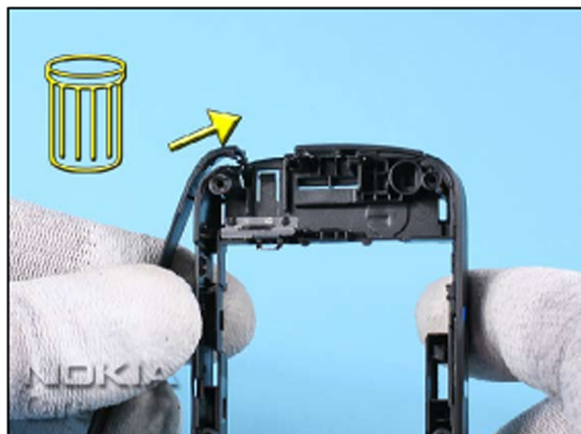
28. Do the same on the other side.



29. Finally, release the both clips on the lower side of the B-COVER and remove the LABEL COVER ASSY.



30. Release the clips of the DECO TRIM RIGHT...



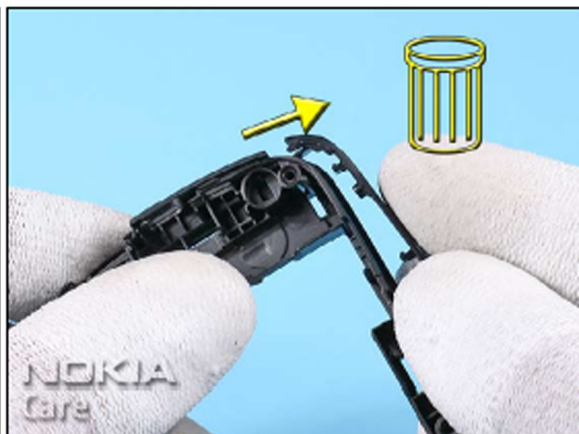
31. ...and discard it after removal.



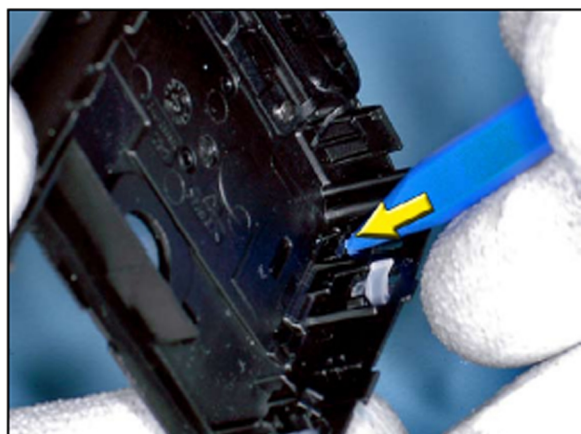
32. Release the clips of the DECO TRIM LEFT.



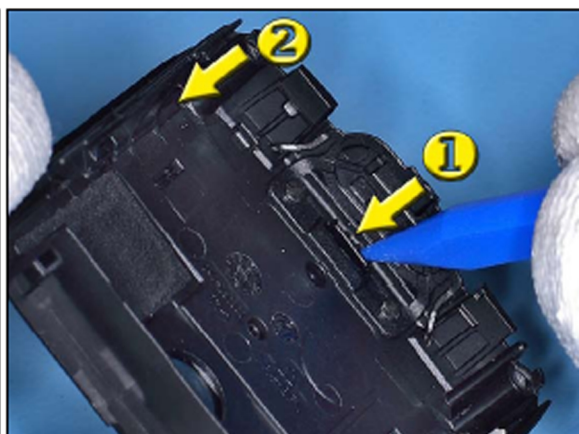
33. Separate the other side of the DECO TRIM from the B-COVER...



34. ...and discard it after removal.



35. Unlock the first snap of the TOP COVER with the SS-93.



36. Now unlock the other two snaps in the order shown.





37. Remove the TOP COVER from the B-COVER.



38. Release the snap from the CONNECTOR in the edge with the dental tool.



39. Now unlock the second snap ...

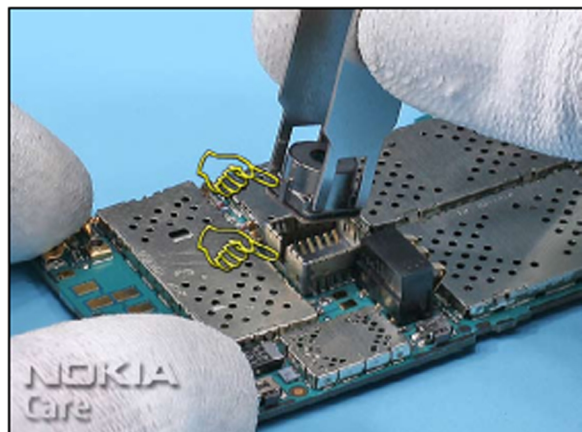


40. ...and remove the CONNECTOR COVER by lifting it up.

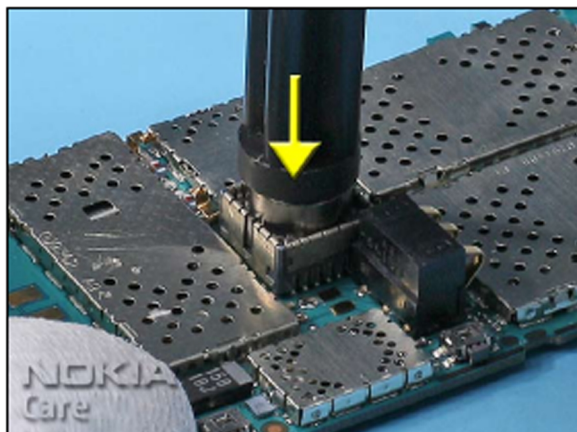


41. The disassembly procedure is now complied.

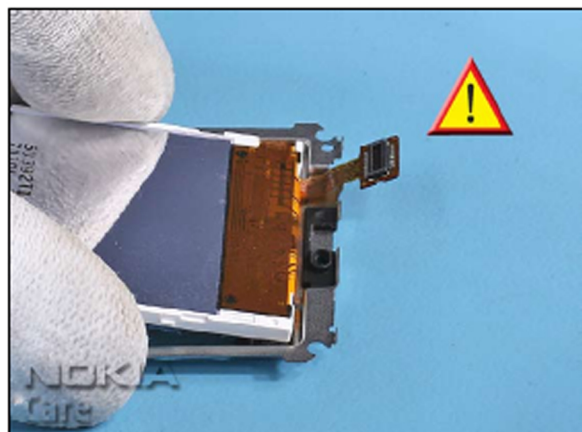
## ■ Assembly hints



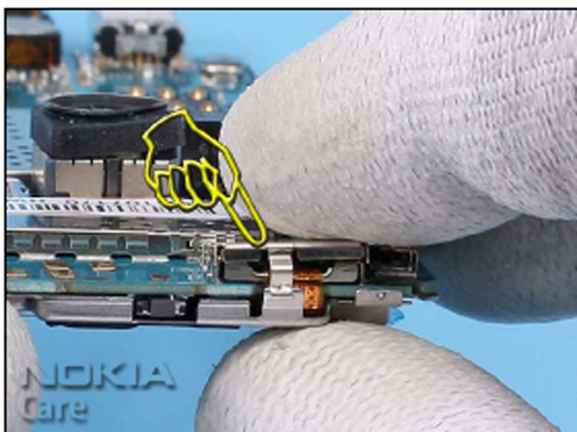
1. Note the right position of the guide when inserting the CAMERA.



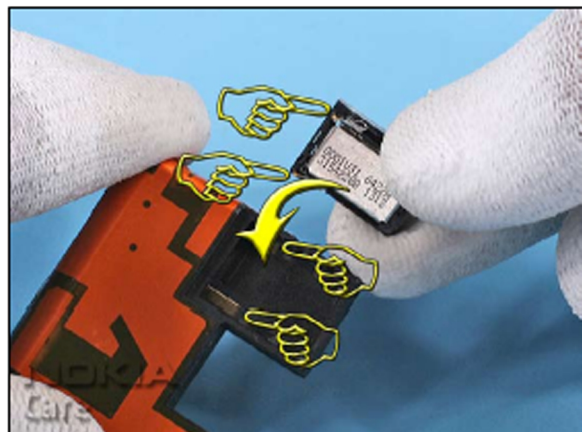
2. Turn the SS-45 and gently press the CAMERA in to place.



3. Place the LCD into the UI-SHIELD ASSY. Note the right position of the LCD flex.



4. Always use a new FLEX SHIELDING LID. Note the right position when assembling.



5. Place the IHF SPEAKER into its holding. Make sure that the spring contacts are in the right place.

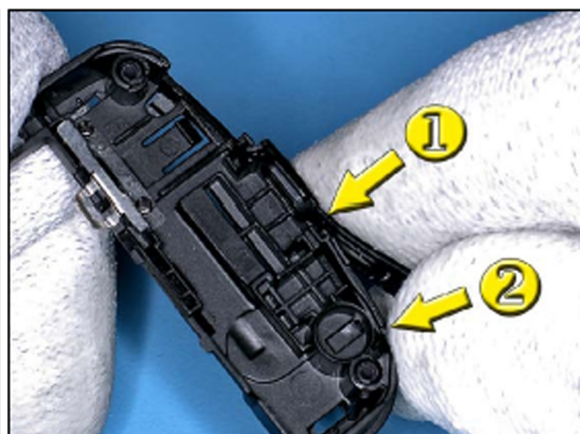


6. Fit the IHF GASKET exactly into its position avoiding touching the IHF SPEAKER.

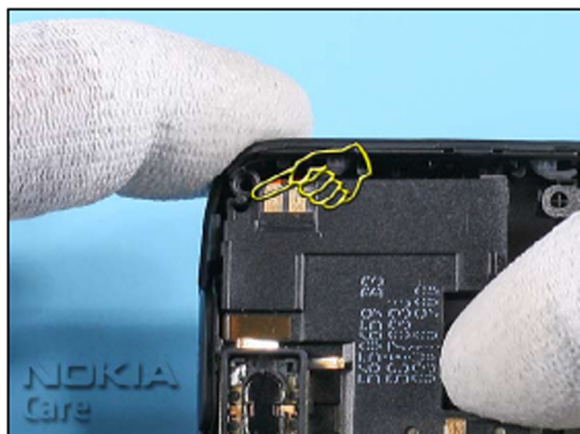




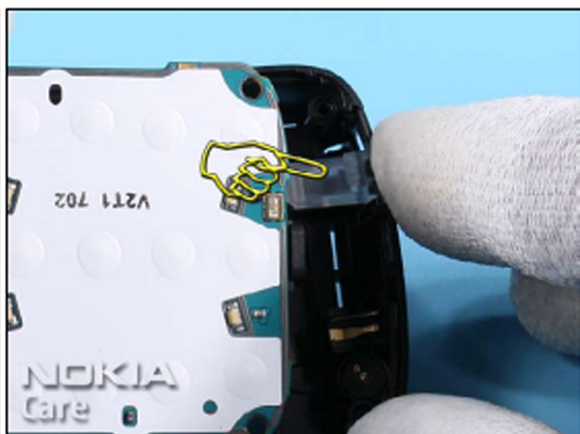
7. First slide the CONNECTOR COVER from top into the guiding from the B-COVER.



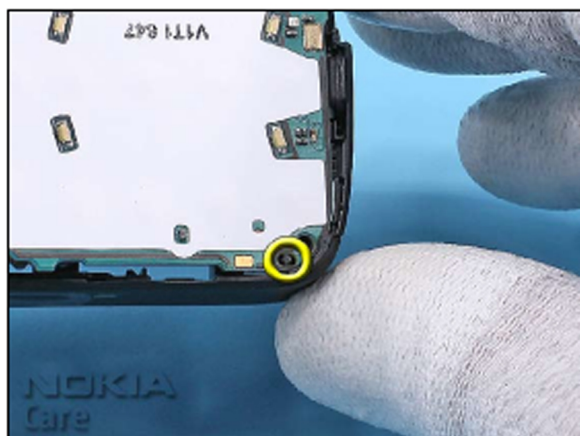
8. Bent the CONNECTOR COVER a bit and close the snaps in the order shown.



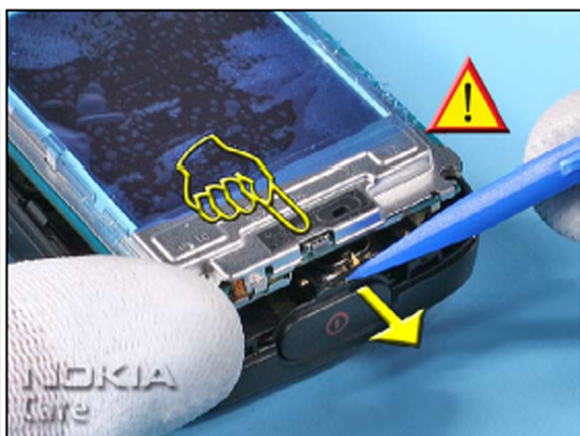
9. Note the guide pin of the B-COVER when inserting the ANTENNA MODULE.



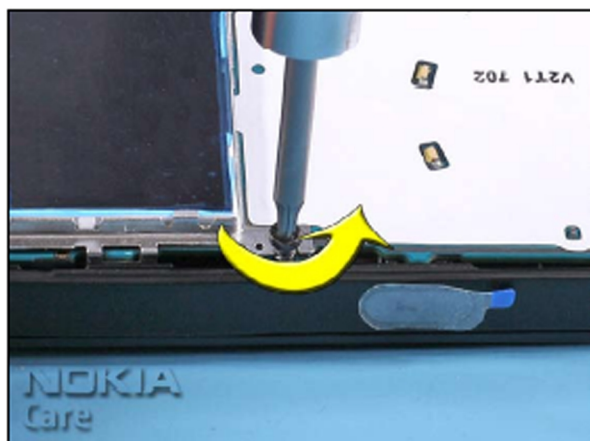
10. Hold the USB DOOR in place while fitting the ENGINE MODULE...



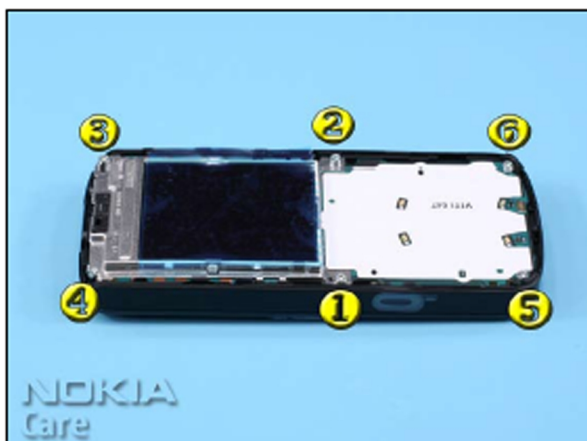
11. Take care to the guide pin of the B-COVER.



12. First, bend back the power key a bit to avoid damaging of the power switch and then place the ENGINE MODULE onto the B-COVER.



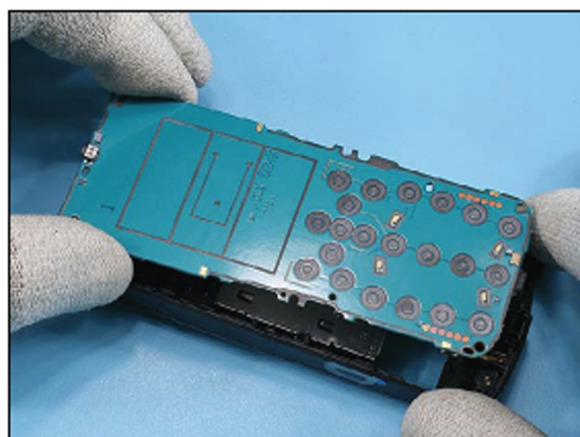
13. To avoid damaging the plastic threads, first turn the screws slightly left to engage the thread...



14. ...and then tighten the screws to the torque of 21Ncm in the order shown.



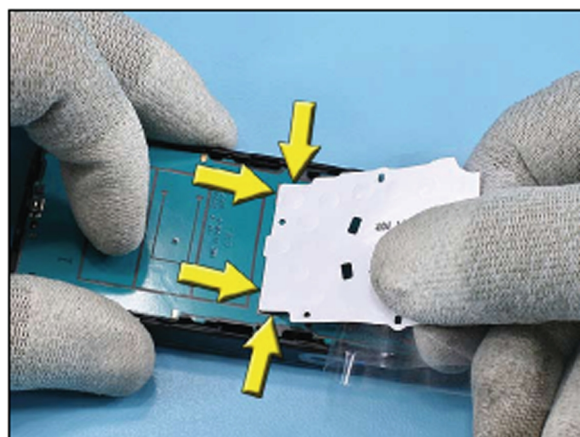
## ■ Dome sheet alignment instruction



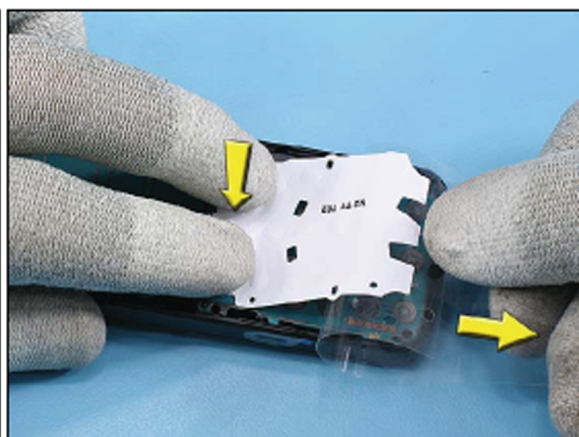
1. Place the 2CB ENGINE MODULE onto the B-COVER ASSY.



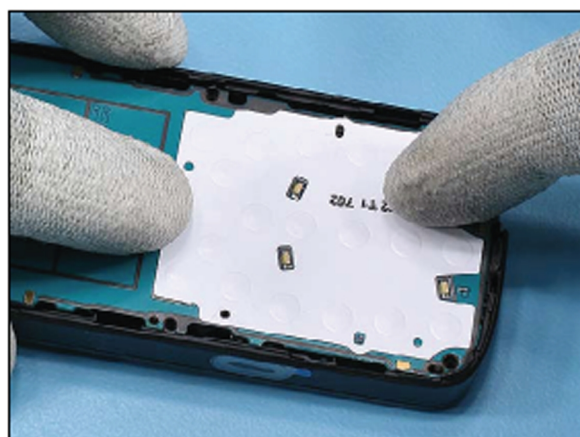
2. Find the two corner markers. Check if the surface of the 2CB ENGINE MODULE is clean and no residue is remaining.



3. Use a new DOME SHEET and flip back a part of the protective film. Align the DOME SHEET with the corner markings and ...



4. ... affix it whilst removing the protective film.



5. Press the DOME SHEET evenly onto the 2CB ENGINE MODULE to make sure that it is glued correctly.



6. Check the correct placement and be sure that the two holes in the DOME SHEET are aligned with ones in the 2CB ENGINE MODULE.

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## **6 — BB Troubleshooting and Manual Tuning Guide**

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## ■ Baseband troubleshooting overview

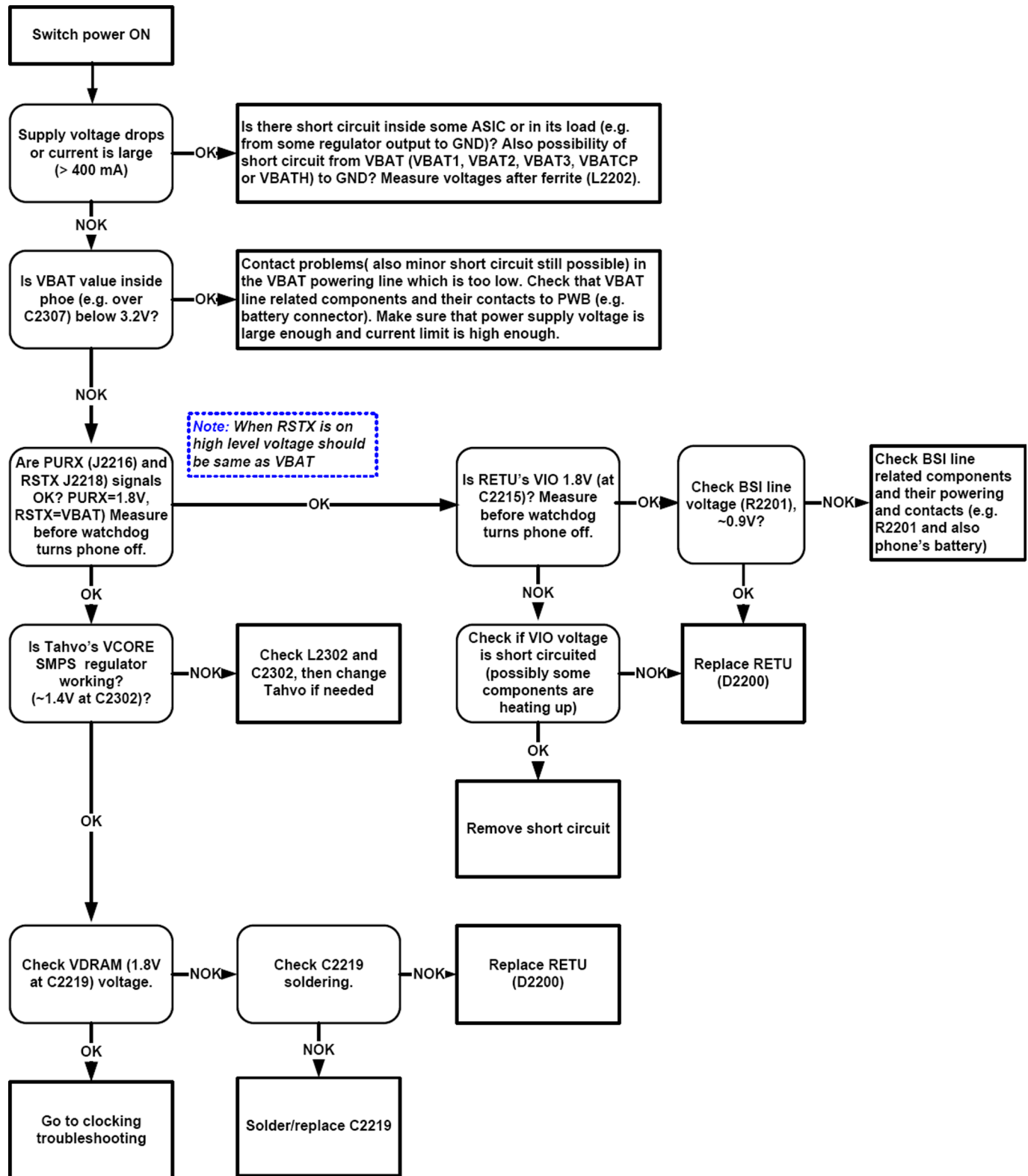
This section is intended to be a guide for localising and repairing electrical faults.  
The table below tells you what troubleshooting to go to.

Problem	Troubleshooting
Abnormal current consumption	<ol style="list-style-type: none"> <li>1 <a href="#">General power checking (page 6-6)</a></li> <li>2 <a href="#">Battery current measuring fault (page 6-6)</a></li> </ol>
Flashing does not work or the problem is not clearly defined	<ol style="list-style-type: none"> <li>1 <a href="#">Flashing (page 6-15)</a></li> <li>2 <a href="#">Clocking (page 6-9)</a></li> <li>3 <a href="#">Combo memory (page 6-14)</a></li> </ol>
Charging does not work	<a href="#">Charging (page 6-8)</a>
Display does not work	<a href="#">Display fault (page 6-20)</a>
Backlights do not work	<ol style="list-style-type: none"> <li>1 <a href="#">Backlight (page 6-23)</a></li> <li>2 <a href="#">LED driver (page 6-24)</a></li> </ol>
USB does not work	<a href="#">USB (page 6-43)</a>
Audio (mic, earpiece, IHF) does not work	<ol style="list-style-type: none"> <li>1 <a href="#">Audio (page 6-26)</a></li> <li>2 <a href="#">Acoustics (page 6-26)</a></li> </ol>
Camera does not work	<ol style="list-style-type: none"> <li>1 <a href="#">Camera baseband hardware (page 6-11)</a></li> <li>2 <a href="#">Camera viewfinder (page 6-12)</a></li> <li>3 <a href="#">Bad image quality (page 6-13)</a></li> </ol>
Bluetooth does not work	<a href="#">Bluetooth (BT) (page 6-37)</a>
FM radio does not work	<a href="#">FM radio (page 6-17)</a>
MicroSD card does not work	<a href="#">MicroSD card (page 6-18)</a>
IrDA does not work	<a href="#">IrDA (page 6-25)</a>

## ■ Power and charging troubleshooting

### General power checking troubleshooting

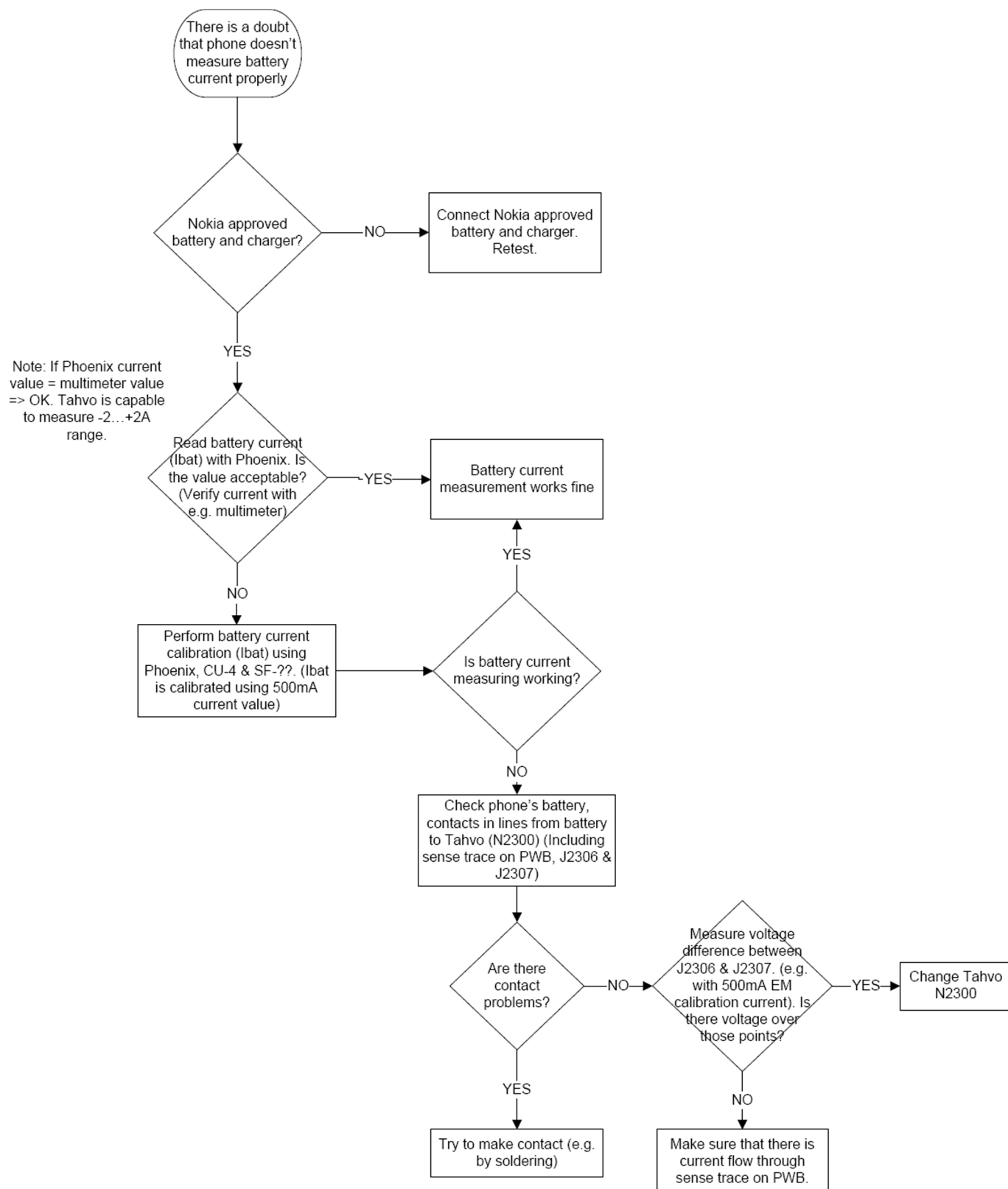
#### Troubleshooting flow





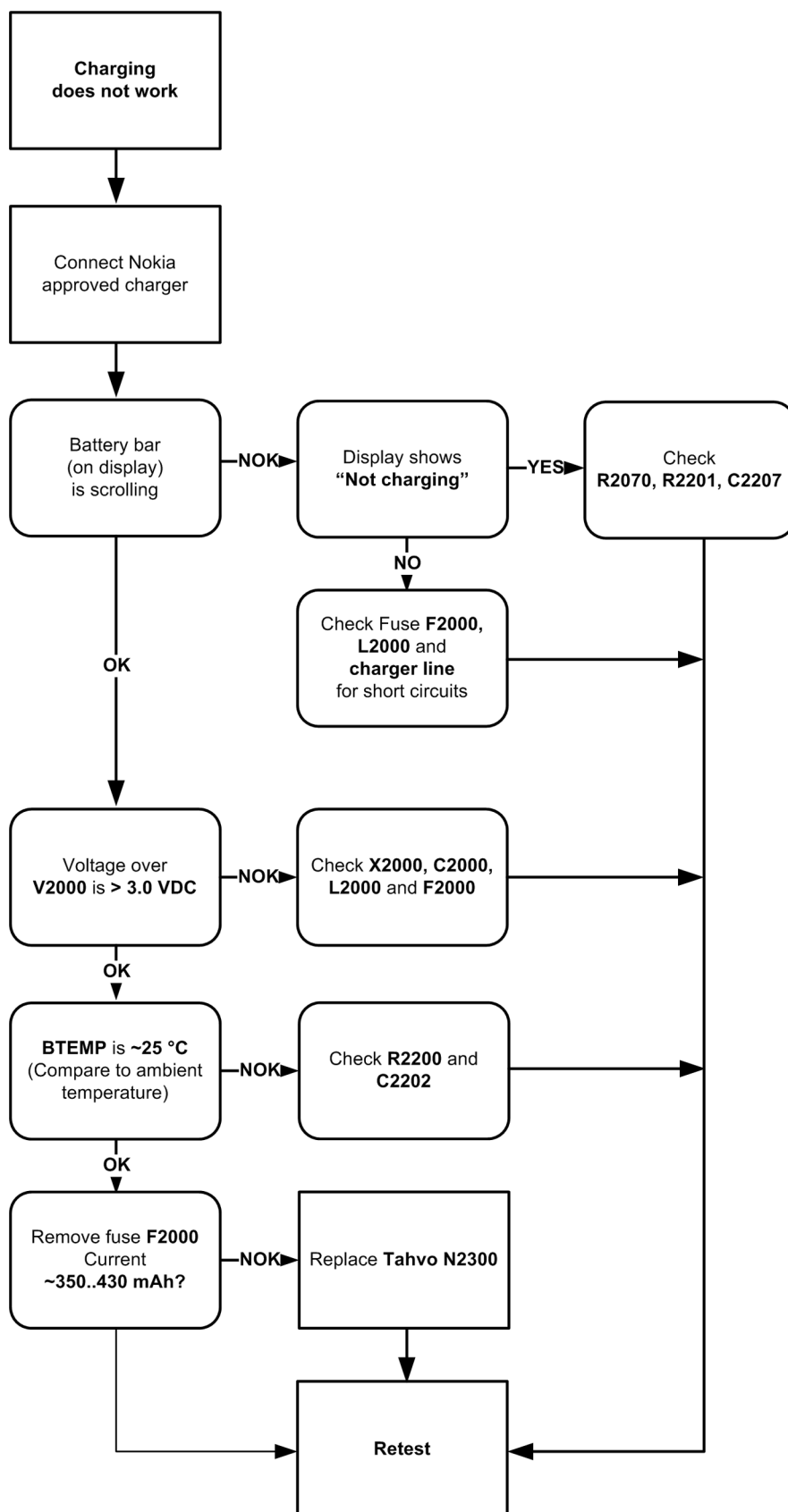
## Battery current measuring fault troubleshooting

### Troubleshooting flow



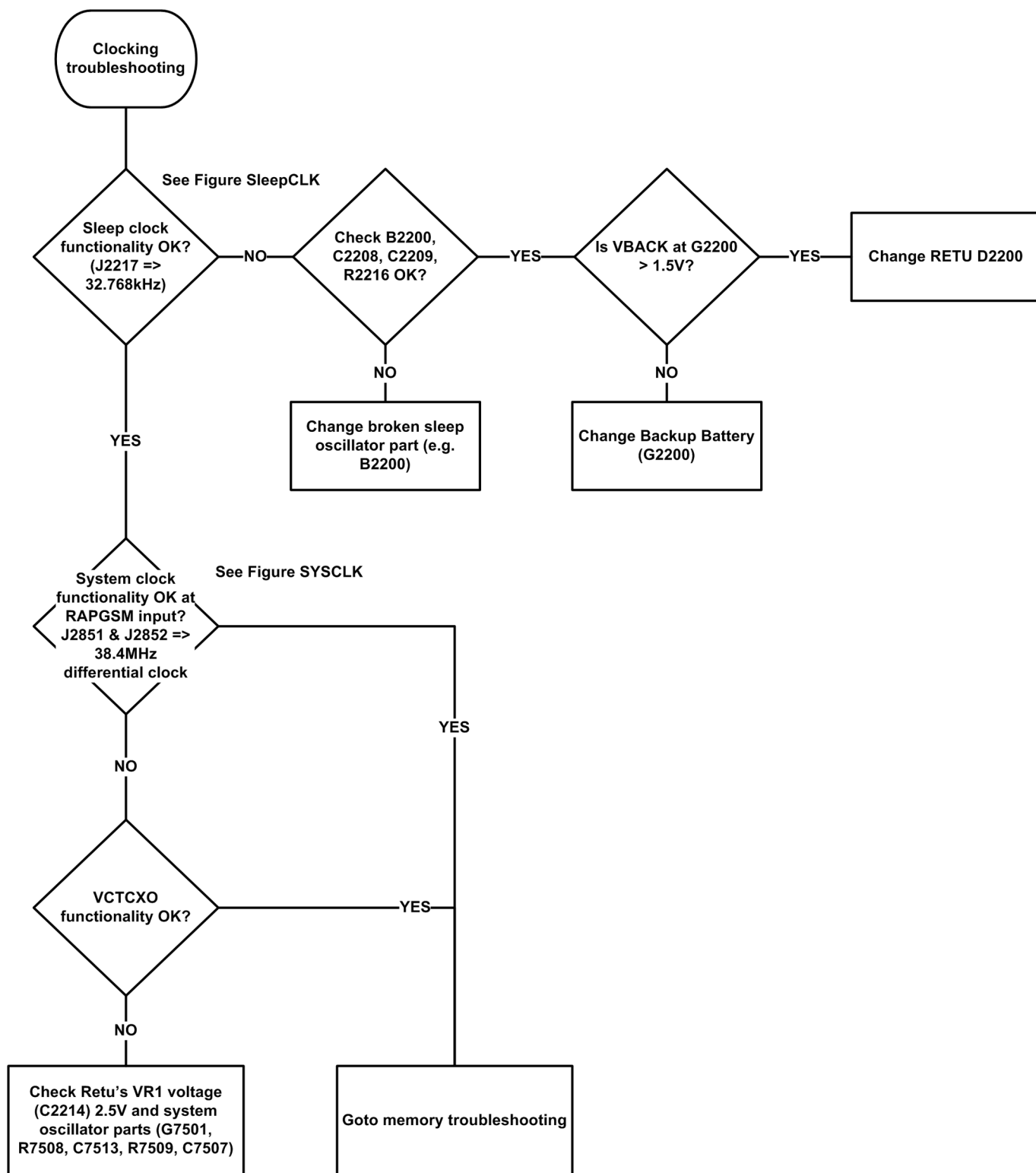
## Charging troubleshooting

### Troubleshooting flow



## Clocking troubleshooting

### Troubleshooting flow



## ■ Interface troubleshooting

### Camera failure

#### *Introduction to camera troubleshooting*

Bad conditions often cause bad pictures. Therefore, the camera operation has to be checked in constant conditions or by using a second, known-to-be-good Nokia device as reference. Image quality is hard to measure quantitatively, and the difference between a good and a bad picture can be small. Some training or experience may be needed to detect what is actually wrong.

When checking for possible errors in camera functionality, knowing what error is suspected significantly helps the testing by narrowing down the amount of test cases. The following types of image quality problems are common:

- Dust (black spots)
- Lack of sharpness
- Bit errors

#### *Taking and evaluating test pictures*

When *taking* a test picture, remember the following:

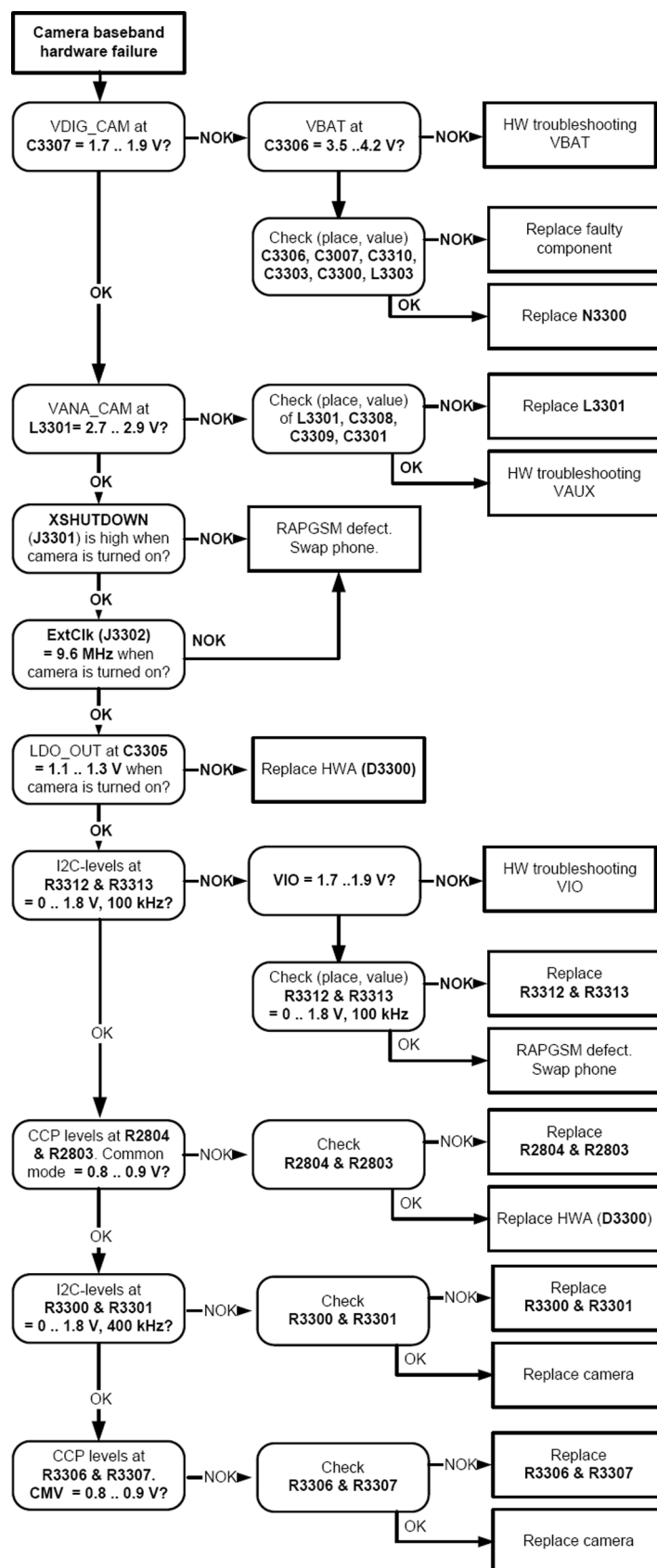
- Avoid bright fluorescent light, 50/60Hz electrical network or high artificial illumination levels
- If the phone is hot, let it rest for a while before taking the picture
- Make sure the optical system is clean
- Use highest possible resolution
- Make sure the light is sufficient (bright office lightning)
- Do not take the picture towards light source
- Be as still as possible when taking the picture
- Distance should be at least 40cm, 1-2m is recommended

When *evaluating* a test picture, remember the following:

- The center of the picture is sharper than the edges
- The image may be blurred, though it does not show in the viewfinder
- Analyse the picture from your PC monitor, full colour setting is recommended
- If possible, compare with a picture of the same motive taken with a similar Nokia device

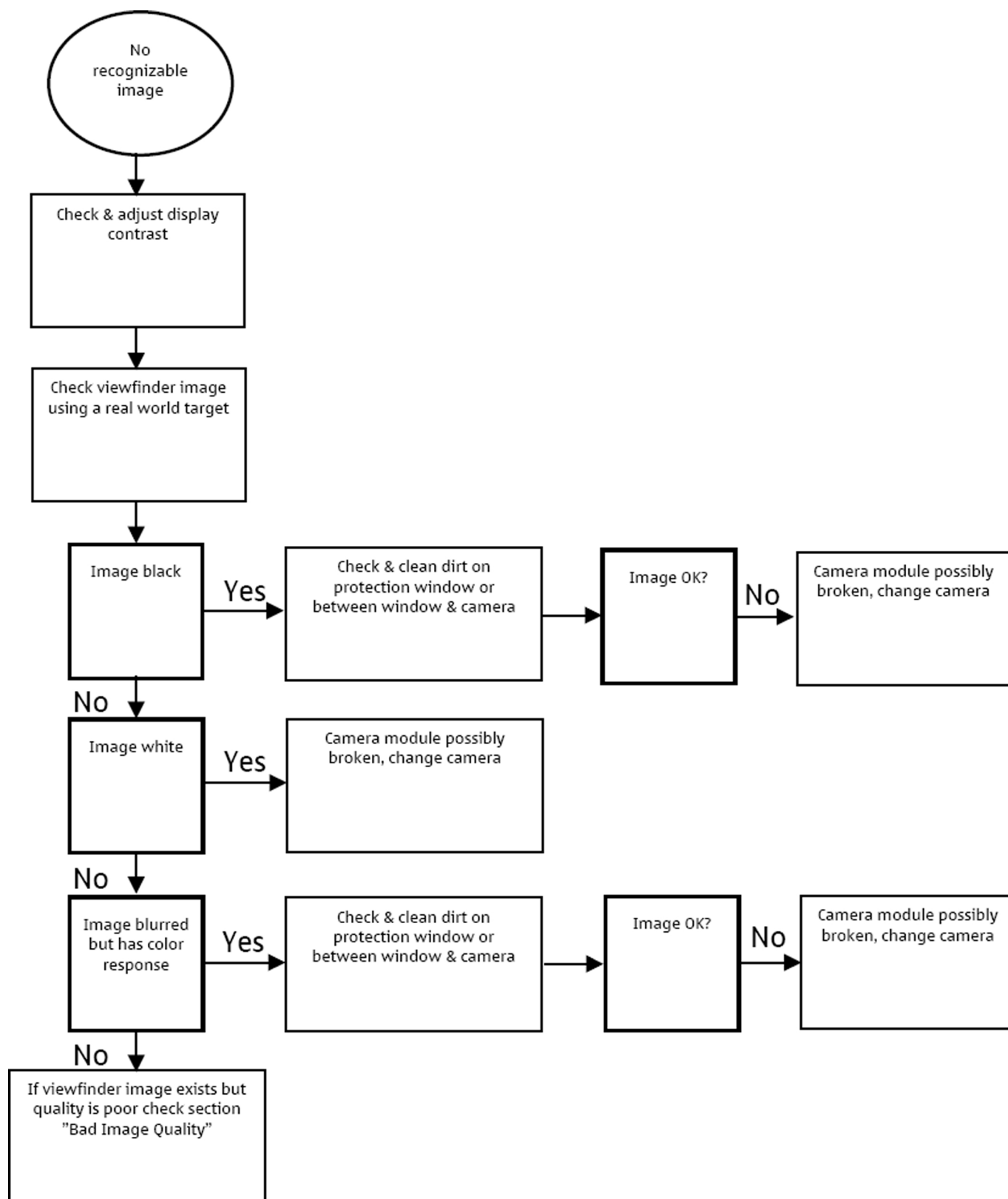
## Camera hardware troubleshooting

### Troubleshooting flow



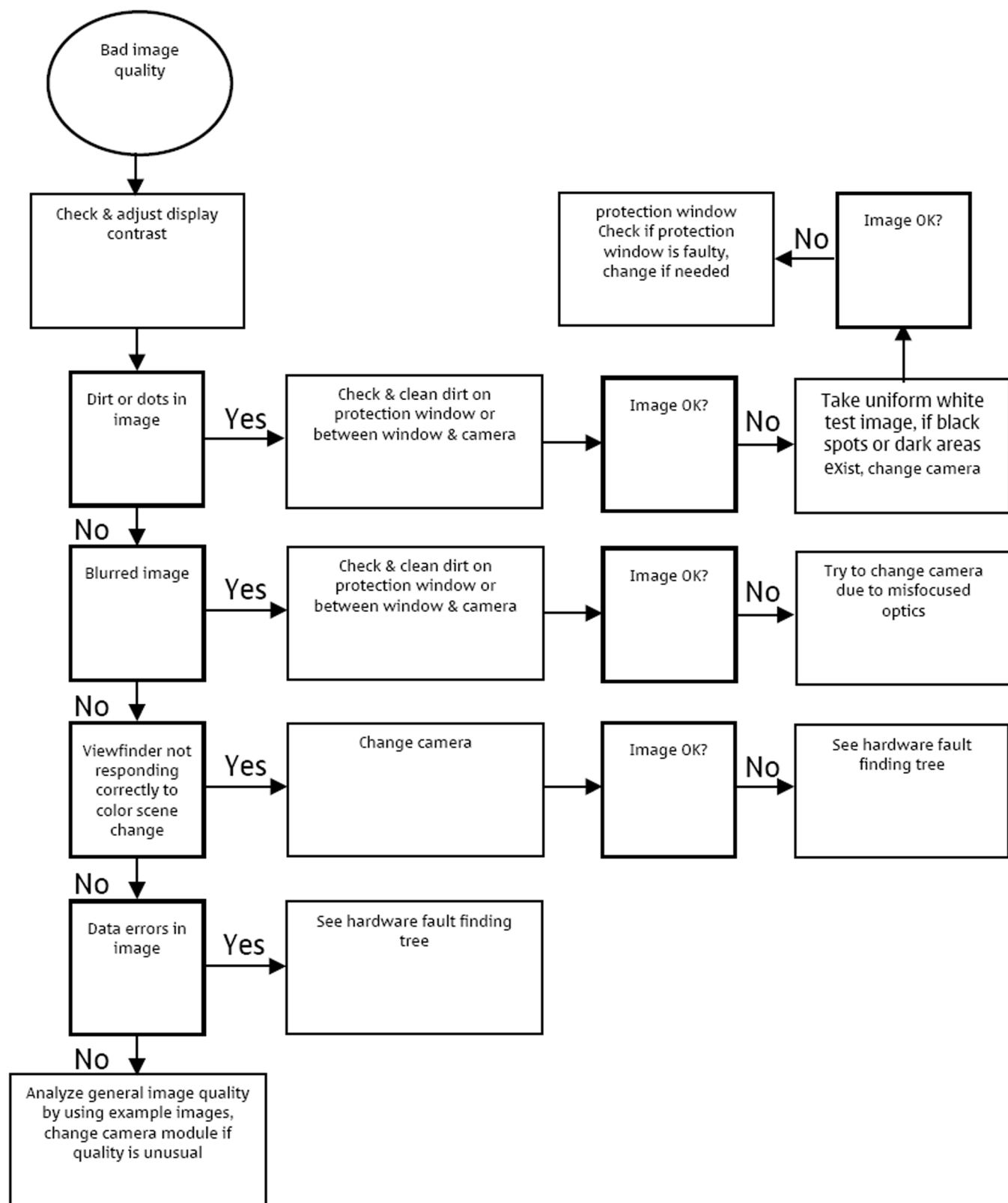
## Camera viewfinder troubleshooting

### Troubleshooting flow



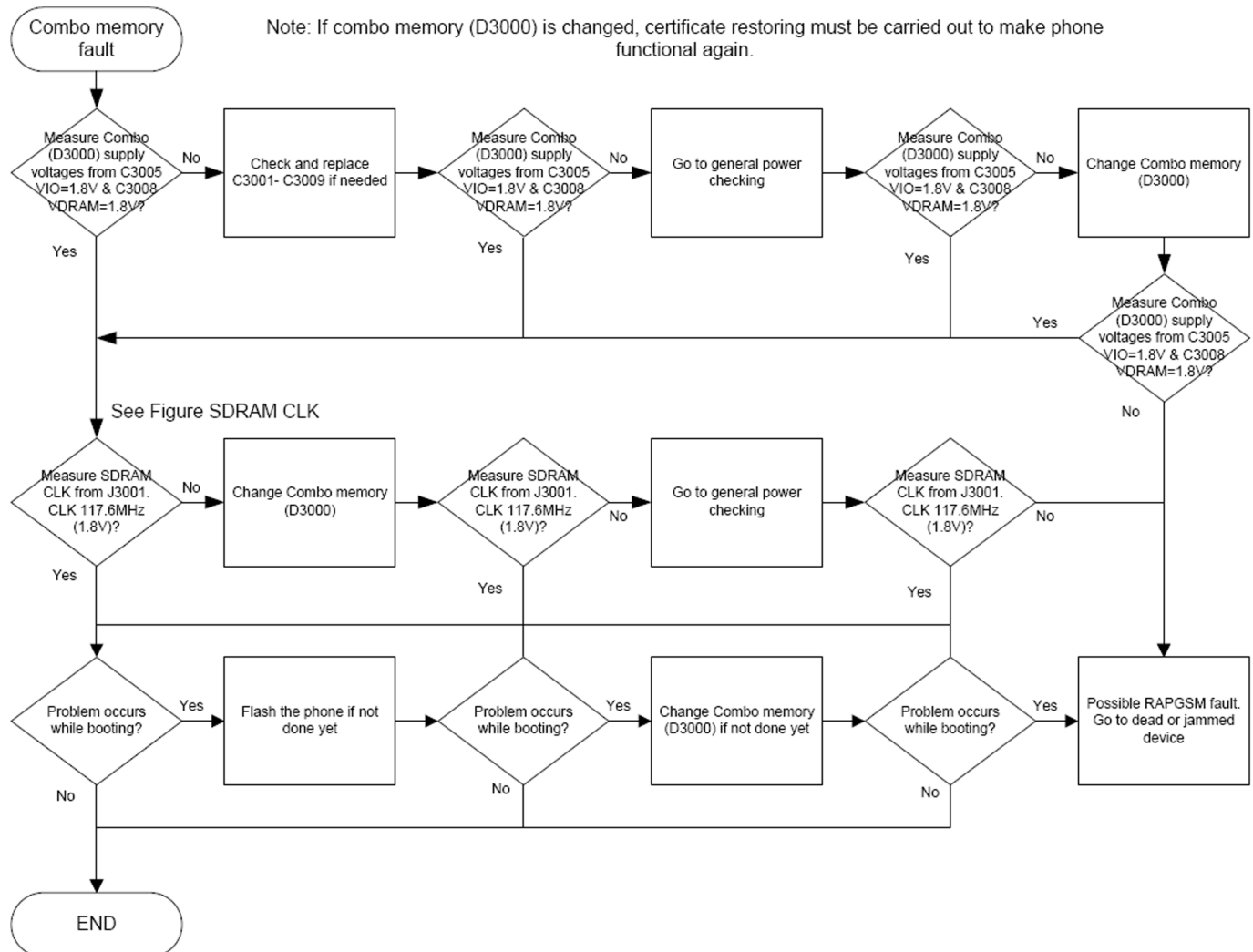
## Camera: Bad image quality troubleshooting

### Troubleshooting flow



## COMBO memory troubleshooting

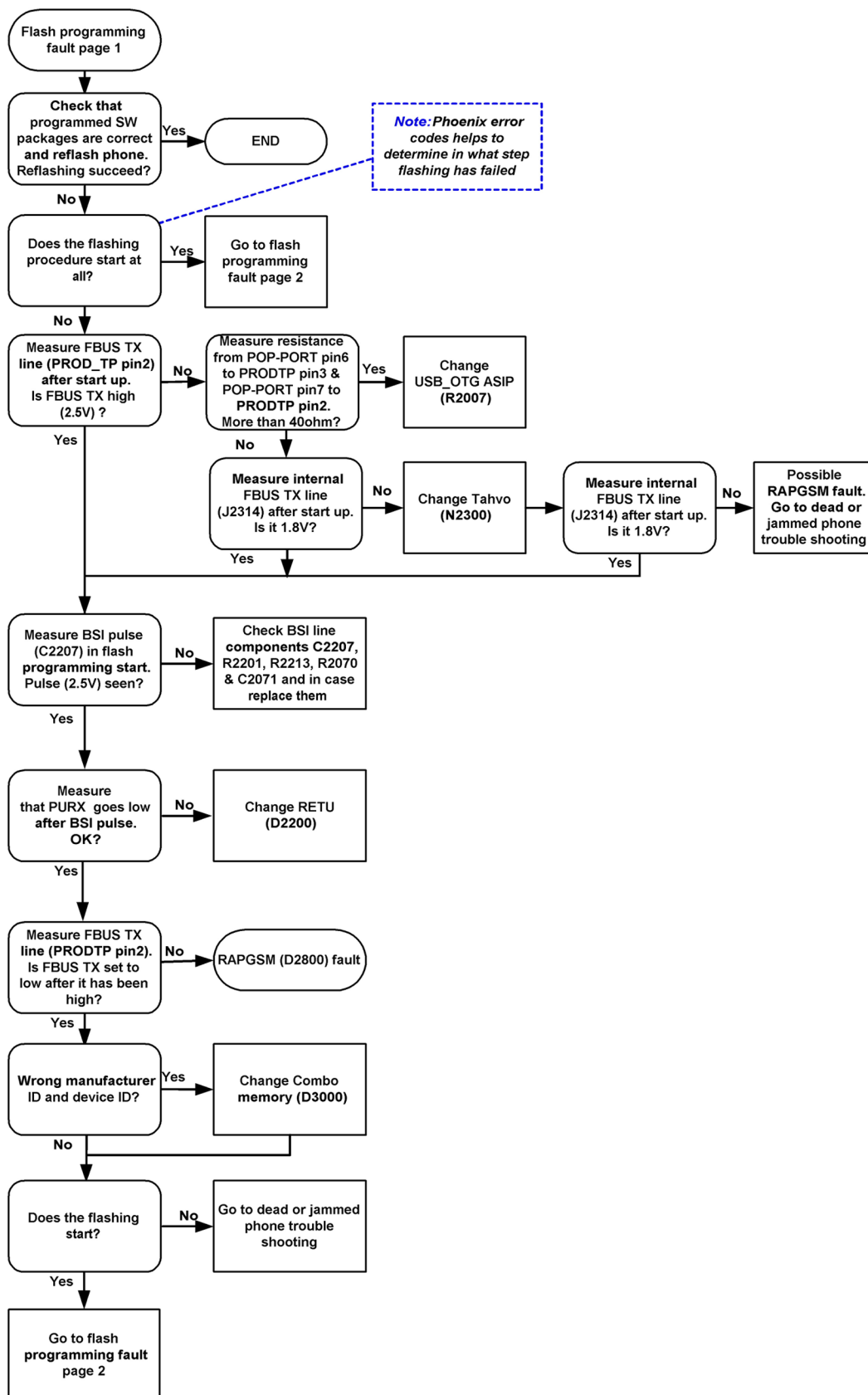
### Troubleshooting flow



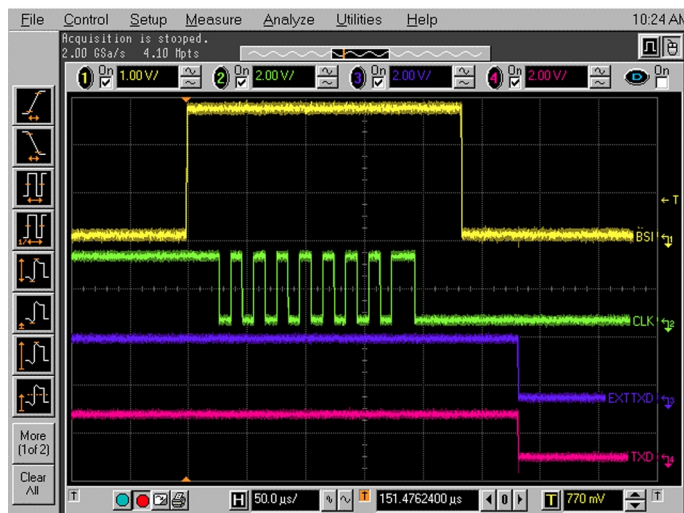


## Flash programming fault troubleshooting

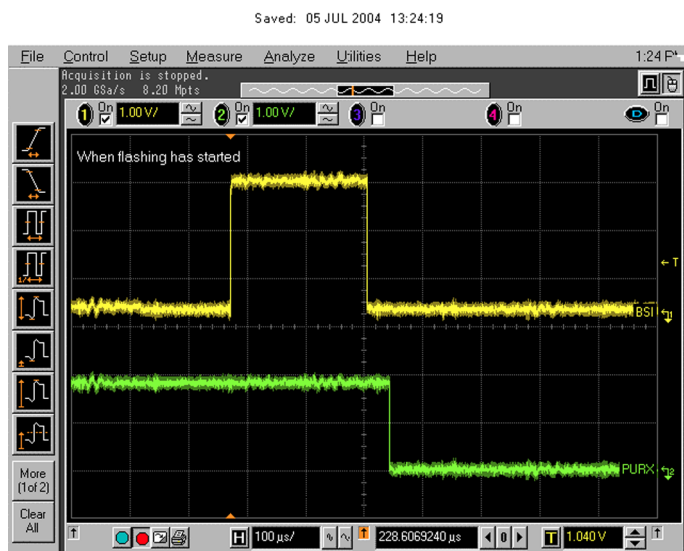
### Part 1



## Part 2



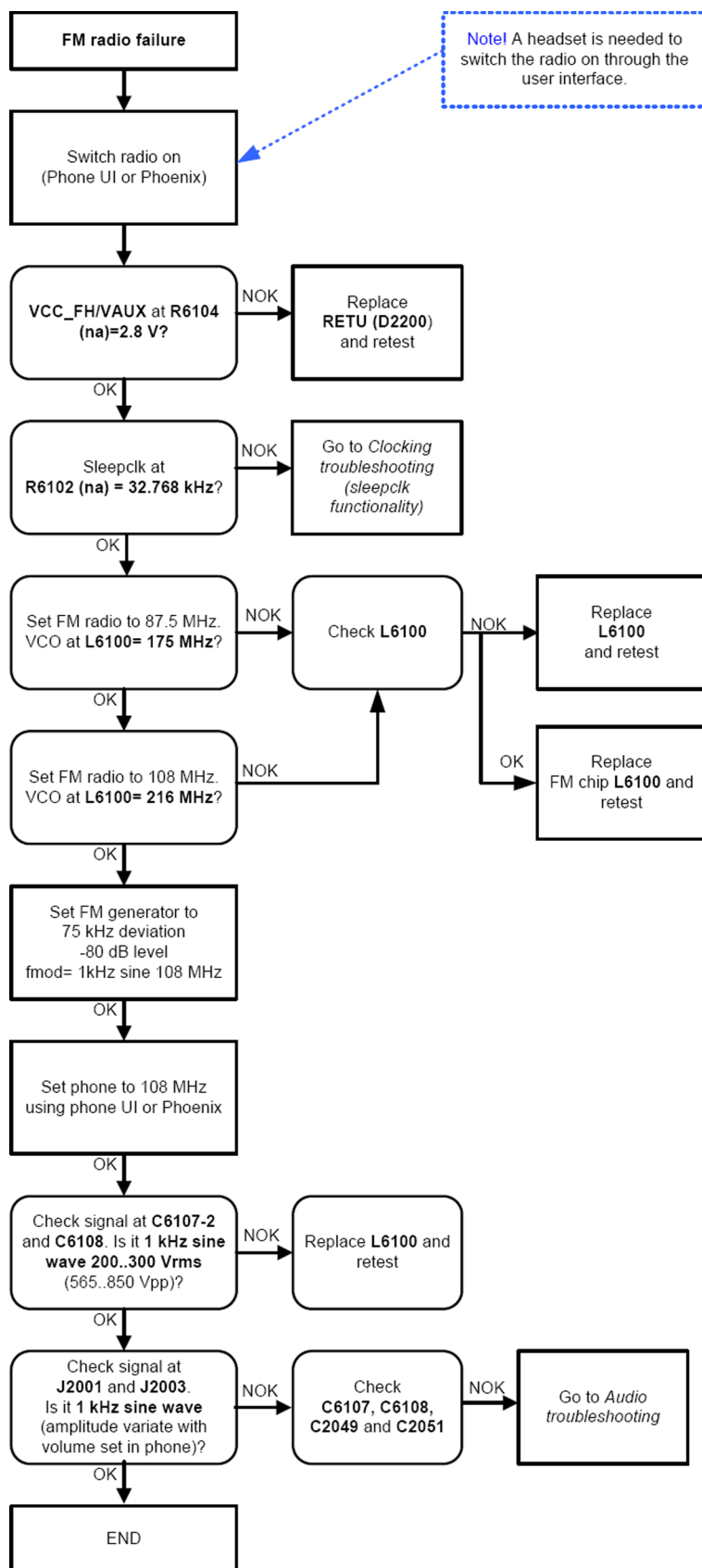
**Figure 33 Flashing pic 1. Take single trig measurement for the rise of the BSI signal.**



**Figure 34 Flashing pic 2. Take single trig measurement for the rise of the BSI signal.**

## FM radio troubleshooting

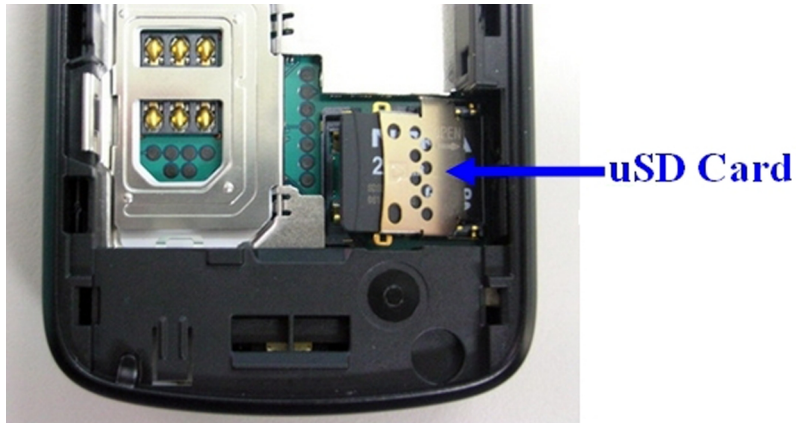
### Troubleshooting flow



## MicroSD card troubleshooting

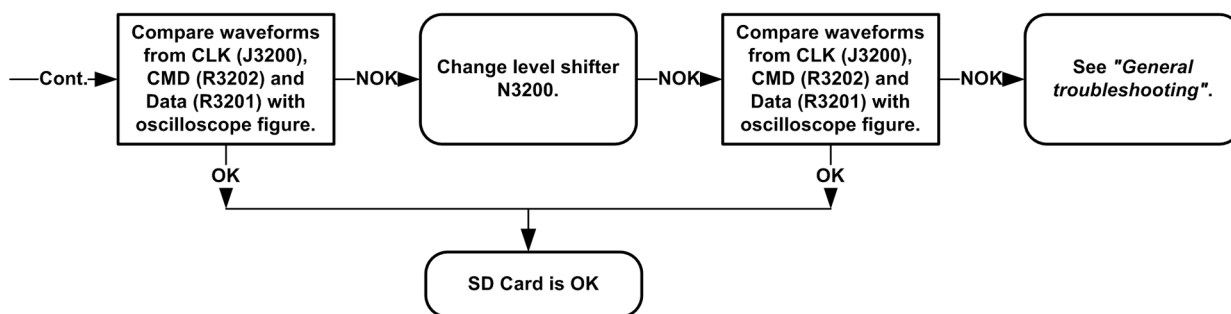
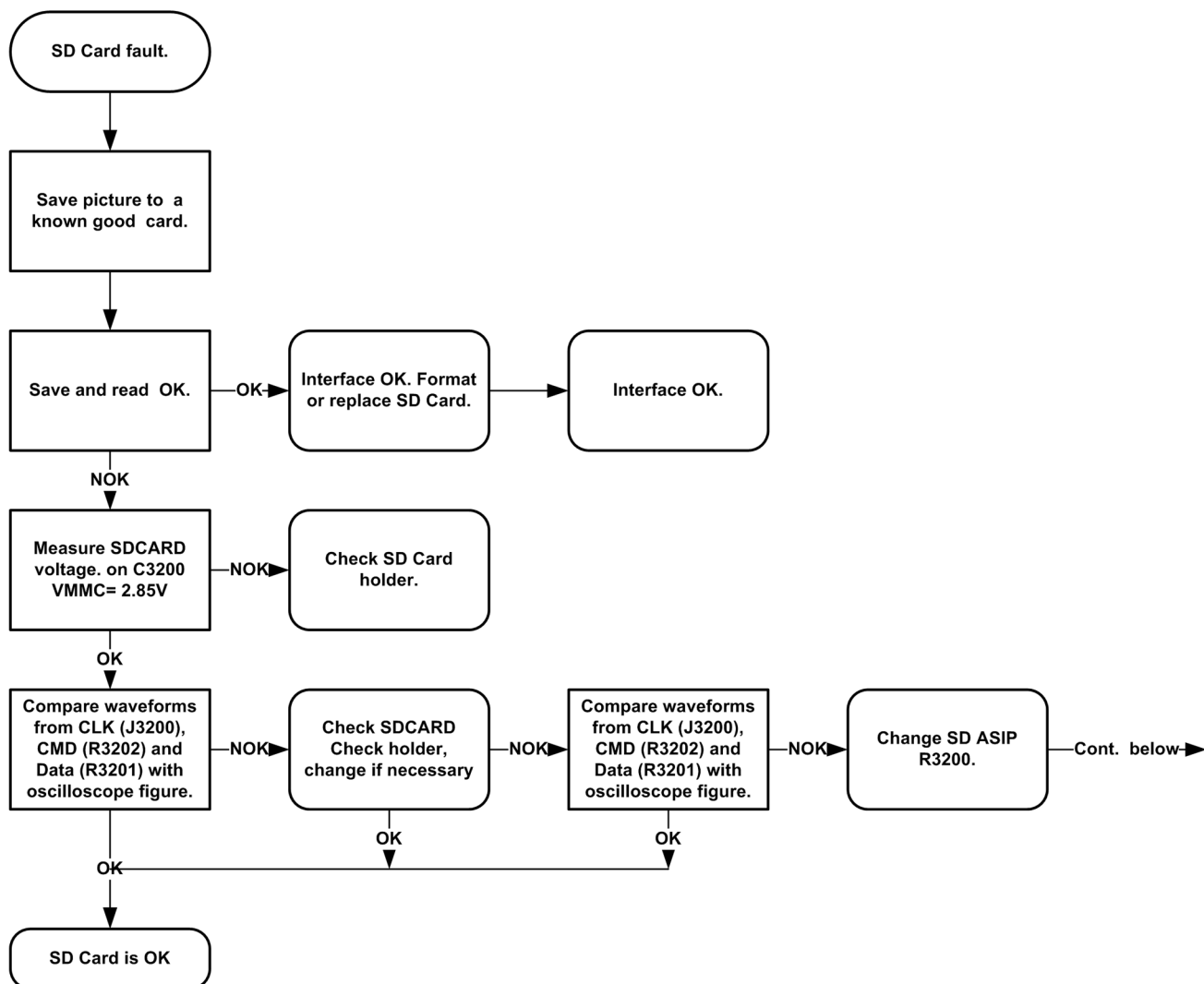
### Context

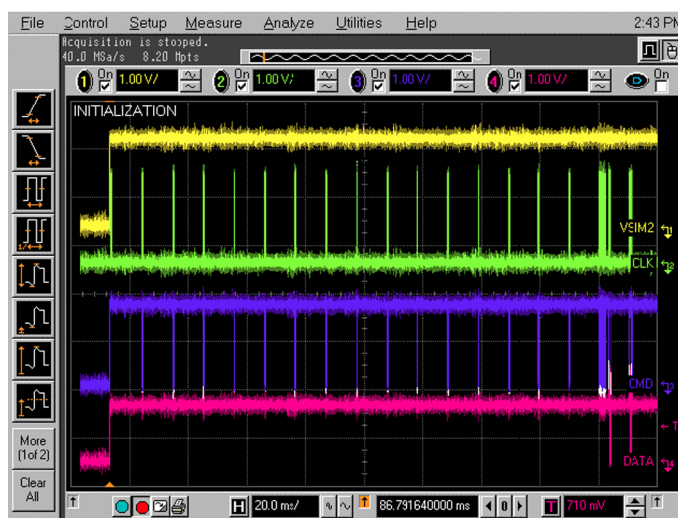
In the RM-237 the microSD card reader is located under the battery cover.



**Figure 35** Location of the microSD card reader in RM-237

## Troubleshooting flow





Take single trig measurement on the rising edge of the DAT signal.

**Figure 36 SD card initialization from pin J3206**

## ■ User interface troubleshooting

### Display module troubleshooting

#### *General instructions for display troubleshooting*

#### Context

The RM-237 has three display modes:

- *Normal mode*: The display is in normal mode when the phone is in active use.
- *Partial idle mode*: The display is in partial idle mode when the power saver is on.
- *Sleep mode*: The display has a sleep mode to conserve power. In this mode the display looks blank, but the phone is switched on. To verify if the phone display is sleeping, press a key.

The operating modes of the display can be controlled with the phone settings menu.

**Table 9 Display module troubleshooting cases**

Display blank	There is no image on the display. The display looks the same when the phone is on as it does when the phone is off. The backlight can be on in some cases.
Image on the display not correct	Image on the display can be corrupted or a part of the image can be missing. If a part of the image is missing, change the display module. If the image is otherwise corrupted, follow the appropriate troubleshooting diagram.
Backlight dim or not working at all	Backlight LED components are inside the display module. Backlight failure can also be in the connector or in the backlight power source in the main engine of the phone.  This means that in case the display is working (image OK), the backlight is faulty.

Visual defects (pixel)	<p>Pixel defects can be checked by controlling the display with Phoenix. Use both colours, black and white, on a full screen.</p> <p>The display may have some random pixel defects that are acceptable for this type of display. The criteria when pixel defects are regarded as a display failure, resulting in a replacement of the display, are presented the following table.</p>
------------------------	--

**Table 10 Pixel defects**

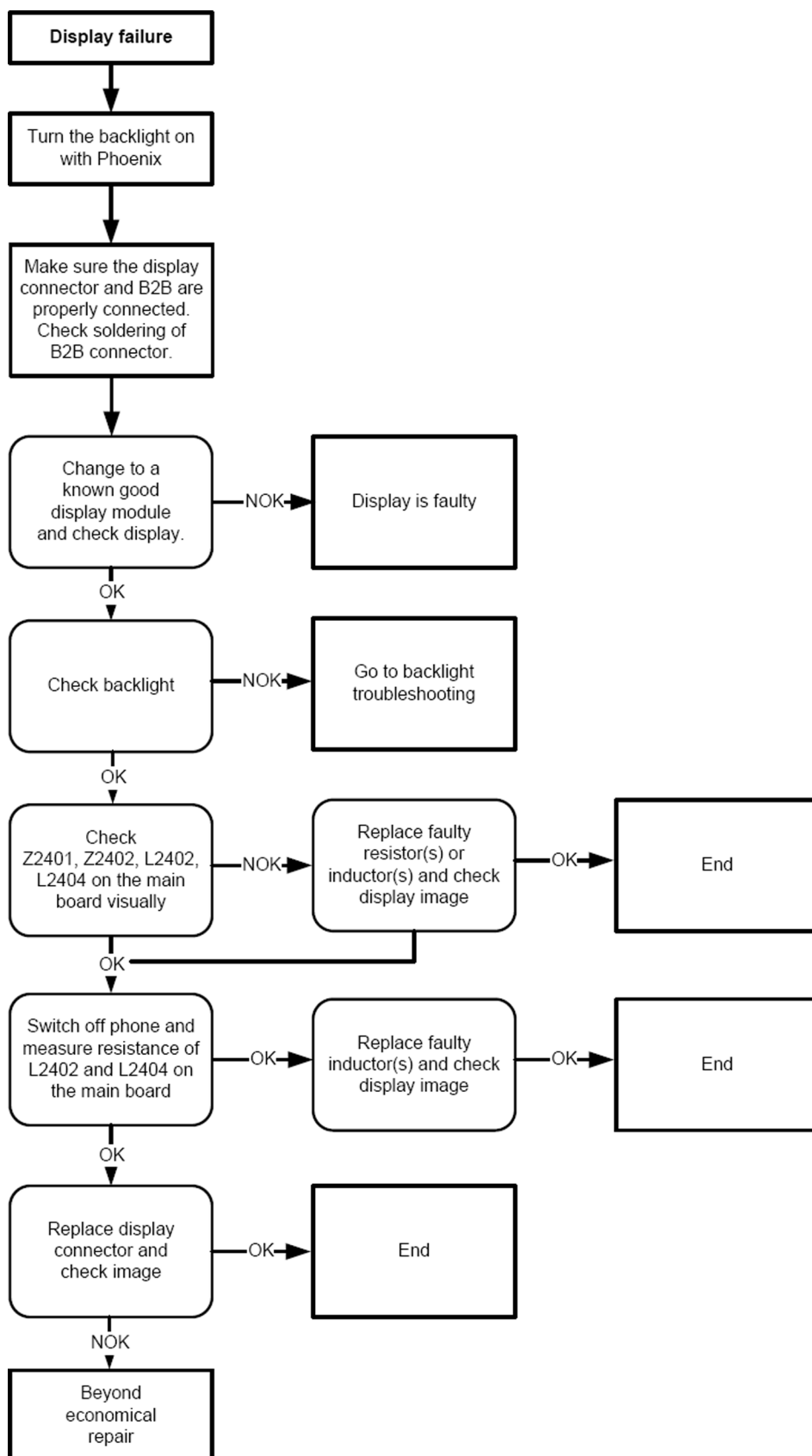
Item		White dot defect				Black dot defect	Total
1	Defect counts	R	G	B	White Dot Total	1	1
		1	1	1	1		
2	Combined defect counts	Not allowed. Two single dot defects that are within 5 mm of each other should be interpreted as combined dot defect.					

## Steps

1. Verify with a working display that the fault is not on the display module itself.  
The display module cannot be repaired.
2. Check that the cellular engine is working normally.
  - i To check the functionality, connect the phone to a docking station.
  - ii Start *Phoenix* service software.
  - iii Read the phone information to check that also the application engine is functioning normally (you should be able to read the APE ID).
3. Proceed to the display troubleshooting flowcharts.  
Use the **Display Test** tool in *Phoenix* to find the detailed fault mode.

## Display troubleshooting

### Troubleshooting flow



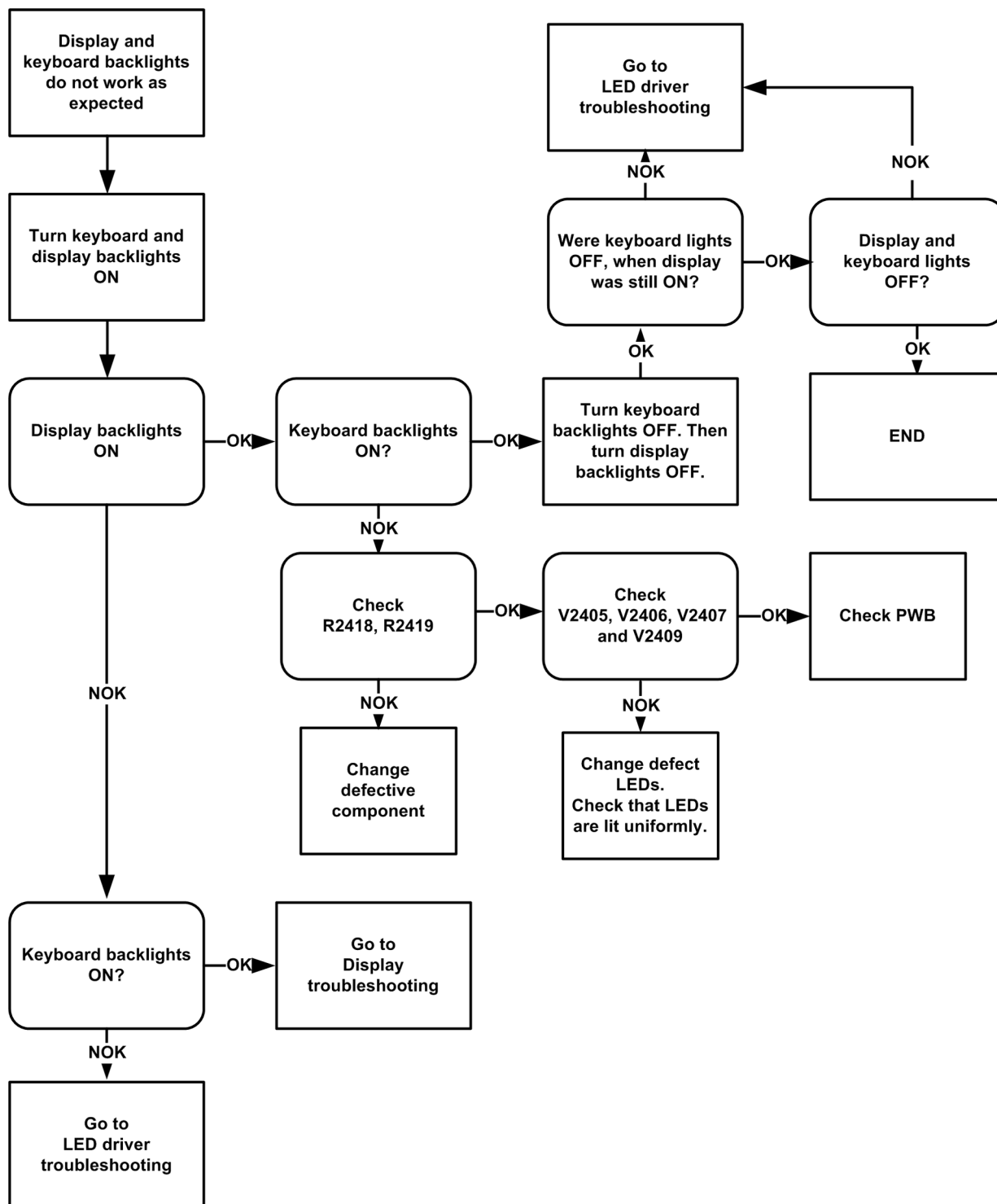


## Backlight troubleshooting

### Context

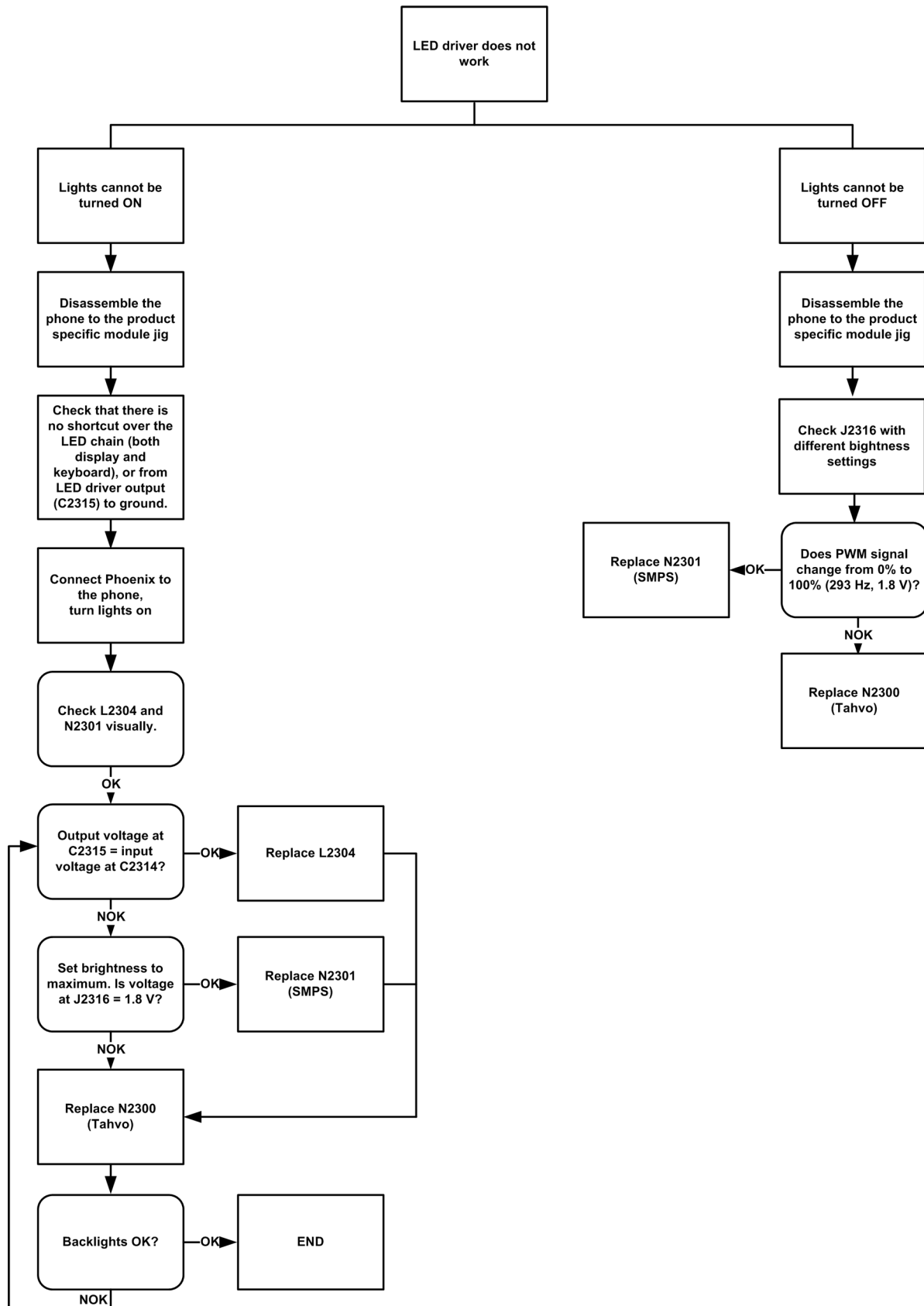
The device has one LED driver that provides current for both the display and keyboard backlights. Brightness can be adjusted manually, and it affects both the display and keypad. Keyboard backlights can be turned ON/OFF separately but not without switching on the display lights.

### Display and keyboard backlight troubleshooting



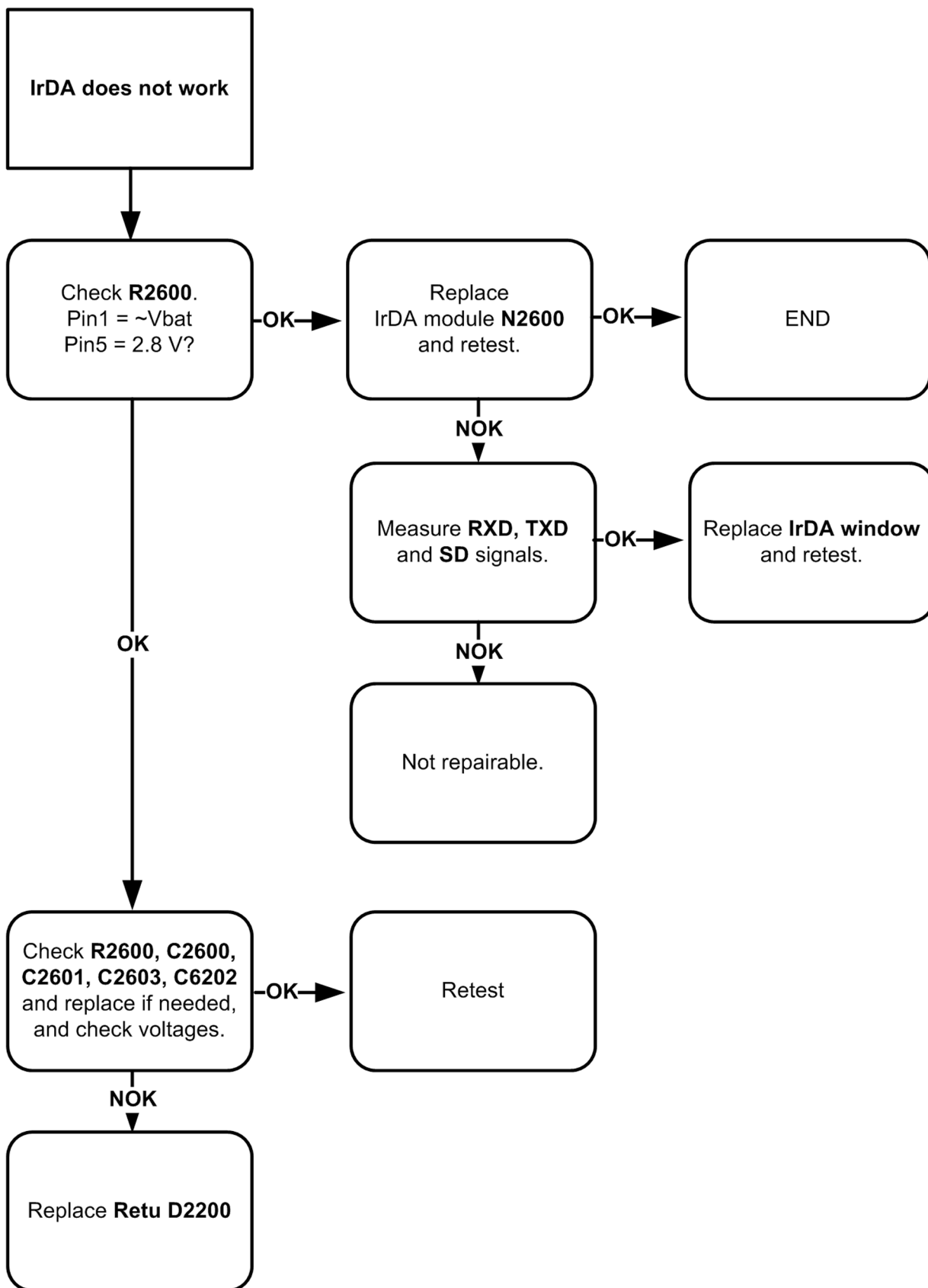
## LED driver troubleshooting

### LED driver troubleshooting



## IrDA troubleshooting

### Troubleshooting flow



## ■ Audio troubleshooting

### Introduction to acoustics troubleshooting

**Note:** Always make sure all openings are clean and all contact pads are intact and make contact. If audio still does not work, please continue to the electronic audio troubleshooting (2nd diagram where applicable).

Acoustics design ensures that the sound is detected correctly with a microphone and properly radiated to the outside of the device by speaker(s). The acoustics of the phone includes three basic systems: earpiece, Integrated Hands Free (IHF) and microphone.

The sound reproduced from the earpiece radiates through a single hole on the front cover (A-cover). The sound reproduced from the IHF speaker radiates from a single sound hole located 3 cm below the power key. The microphone is located at the hinge, next to the system connector.

For a correct functionality of the phone, all sound holes must be always open. When the phone is used, care must be taken not to close any of those holes with a hand or fingers. The phone should be dry and clean, and no objects must be located in such a way that they close any of the holes.

### Audio troubleshooting test instructions

Differential internal earpiece outputs can be measured either with a single-ended or a differential probe.

When measuring with a single-ended probe each output is measured against the ground.

Internal handsfree output is measured using a current probe, if a special low-pass filter designed for measuring a digital amplifier is not available. Note also that when using a current probe, the input signal frequency must be set to 2kHz.

The input signal for each loop test can be single-ended.

### Required equipment

The following equipment is needed for the tests:

- Oscilloscope
- Function generator (sine waveform)
- Current probe (Internal handsfree PWM output measurement)
- Phoenix service software
- Battery voltage 3.7V

### Test procedure

Audio can be tested using the Phoenix audio routings option. Three different audio loop paths can be activated:

- External microphone to Internal earpiece
- External microphone to Internal handsfree speaker
- Internal microphone to External earpiece

Each audio loop sets routing from the specified input to the specified output enabling a quick in-out test. Loop path gains are fixed and they cannot be changed using Phoenix. Correct pins and signals for each test are presented in the following table.

### Phoenix audio loop tests and test results

The results presented in the table apply when no accessory is connected and battery voltage is set to 3.7V.

Earpiece, internal microphone and speaker are in place during measurement. Applying a headset accessory during measurement causes a significant drop in measured quantities.

The gain values presented in the table apply for a differential output vs. single-ended/differential input.

Loop test	Input terminal	Output terminal	Path gain [dB] (fixed)	Input voltage [mVp-p]	Differential output voltage [mVp-p]	Output DC level [V]	Output current [mA]
External Mic to External Earpiece	XMICP and GND	HSEAR R and GND	-2.9	1000	720	1.2	NA
		HSEAR L and GND					
External Mic to Internal Earpiece	XMICP and GND	EarP and GND	-4.0	750	490	1.2	NA
		EarN and GND					
External Mic to Internal handsfree	XMICP and GND	E2101 pad	8.5	920	2520	0	25mA (calc.)
		E2102 pad					
Internal Mic to External Earpiece	B2100 (OUT/GND)	HSEAR R and GND	22.7	100	1360	1.2	NA
		HSEAR L and GND					

## Measurement data

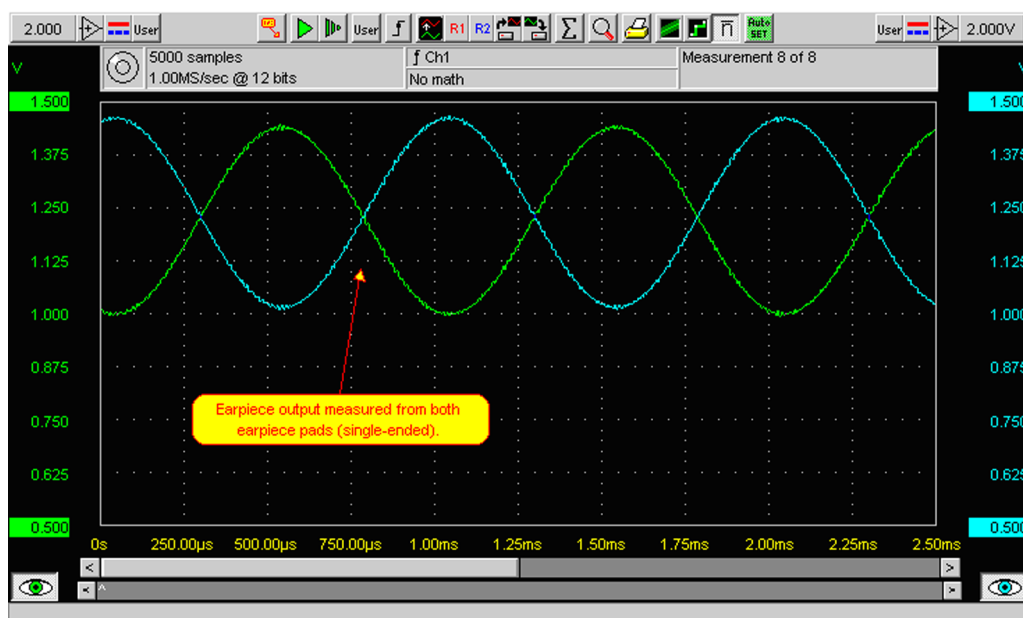
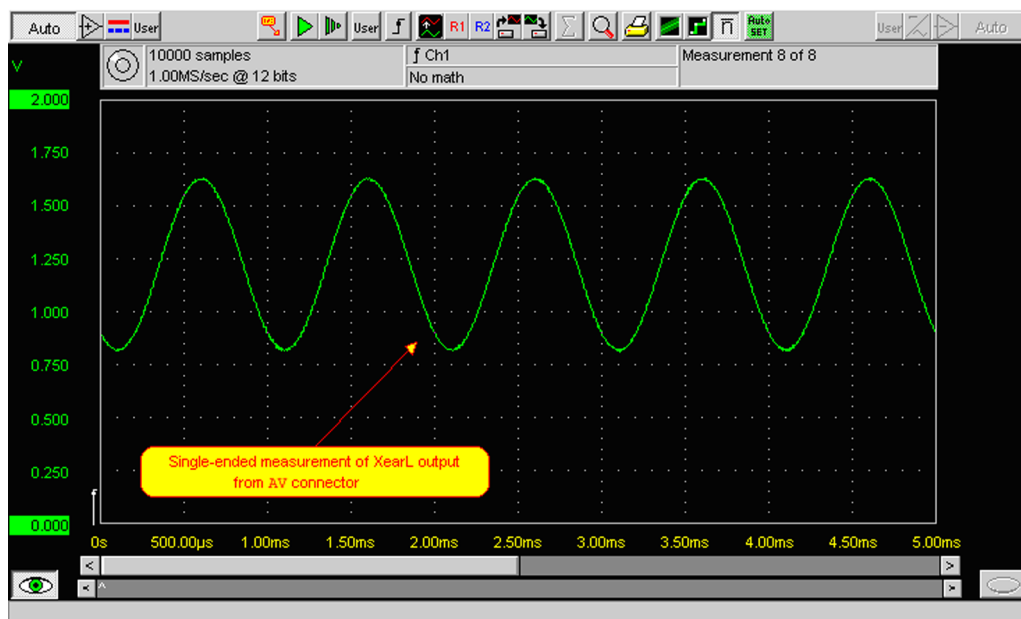


Figure 37 Single-ended output waveform of the Ext\_in\_HP\_out measurement when earpiece is connected.



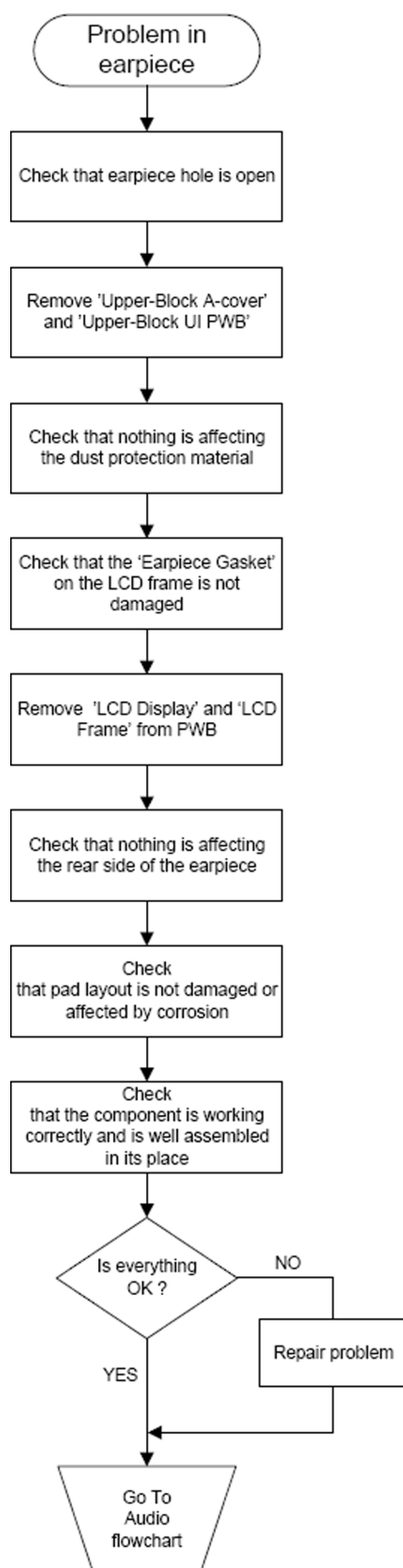
**Figure 38** Differential output waveform of the Ext\_in\_IHF\_out out loop measurement when speaker is connected.



**Figure 39** Single-ended output waveform of the HP\_in\_Ext\_out loop when microphone is connected.

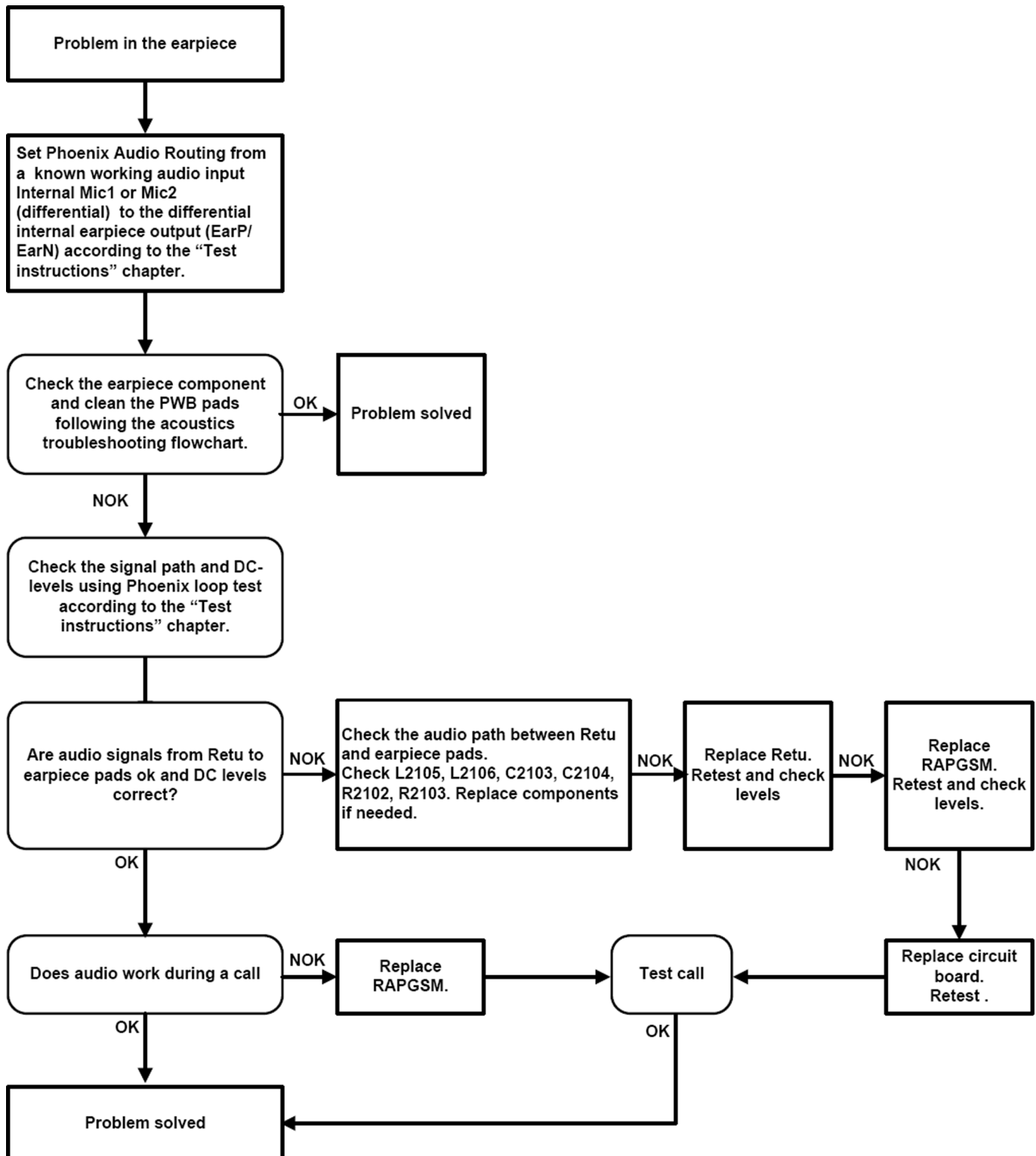
## Earpiece troubleshooting

### Troubleshooting flow



## Internal earpiece troubleshooting

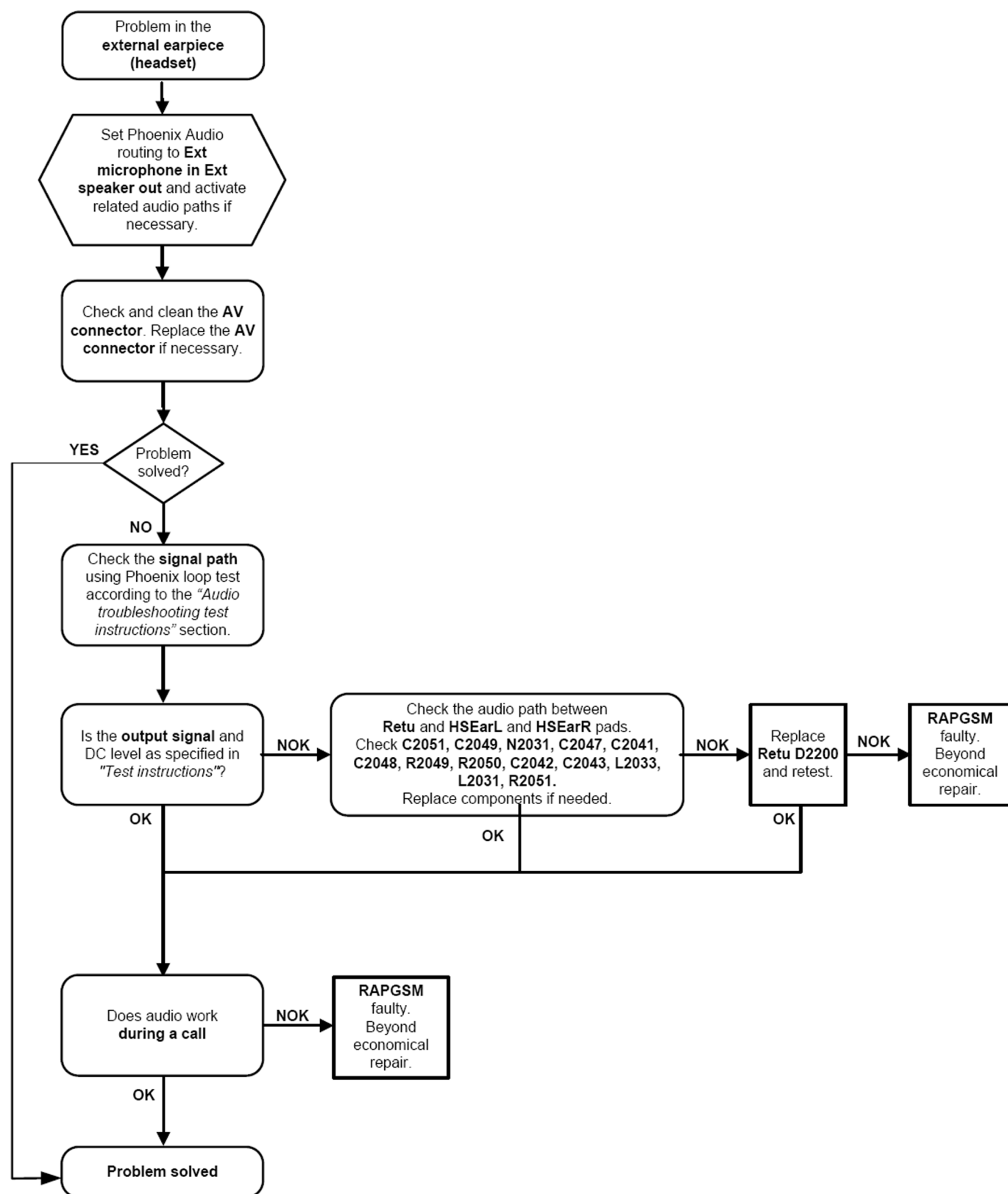
### Troubleshooting flow





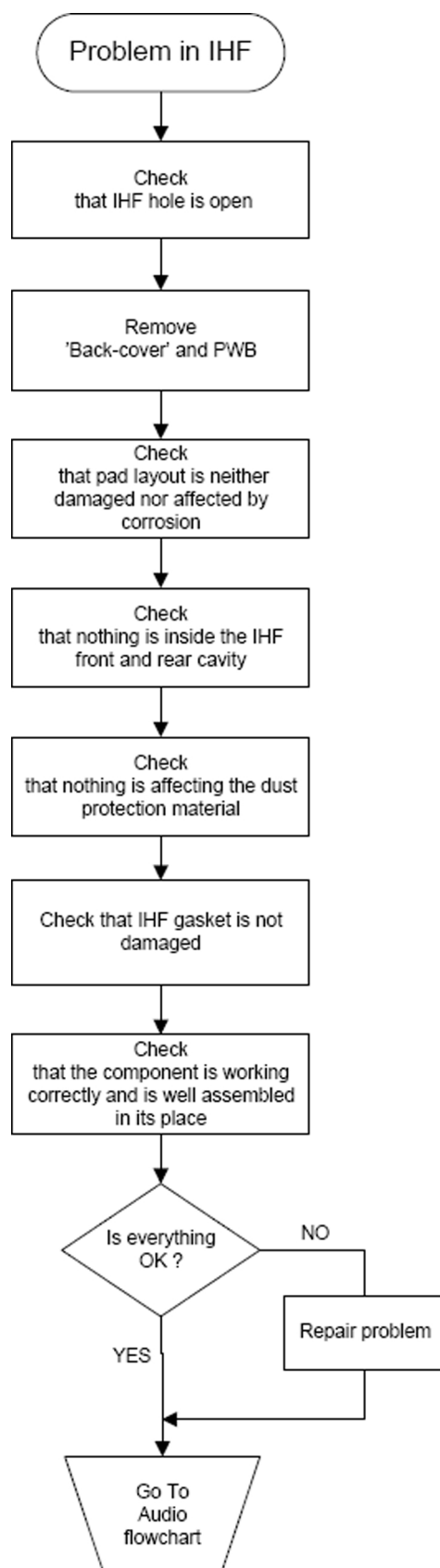
## External headset earpiece troubleshooting

### Troubleshooting flow



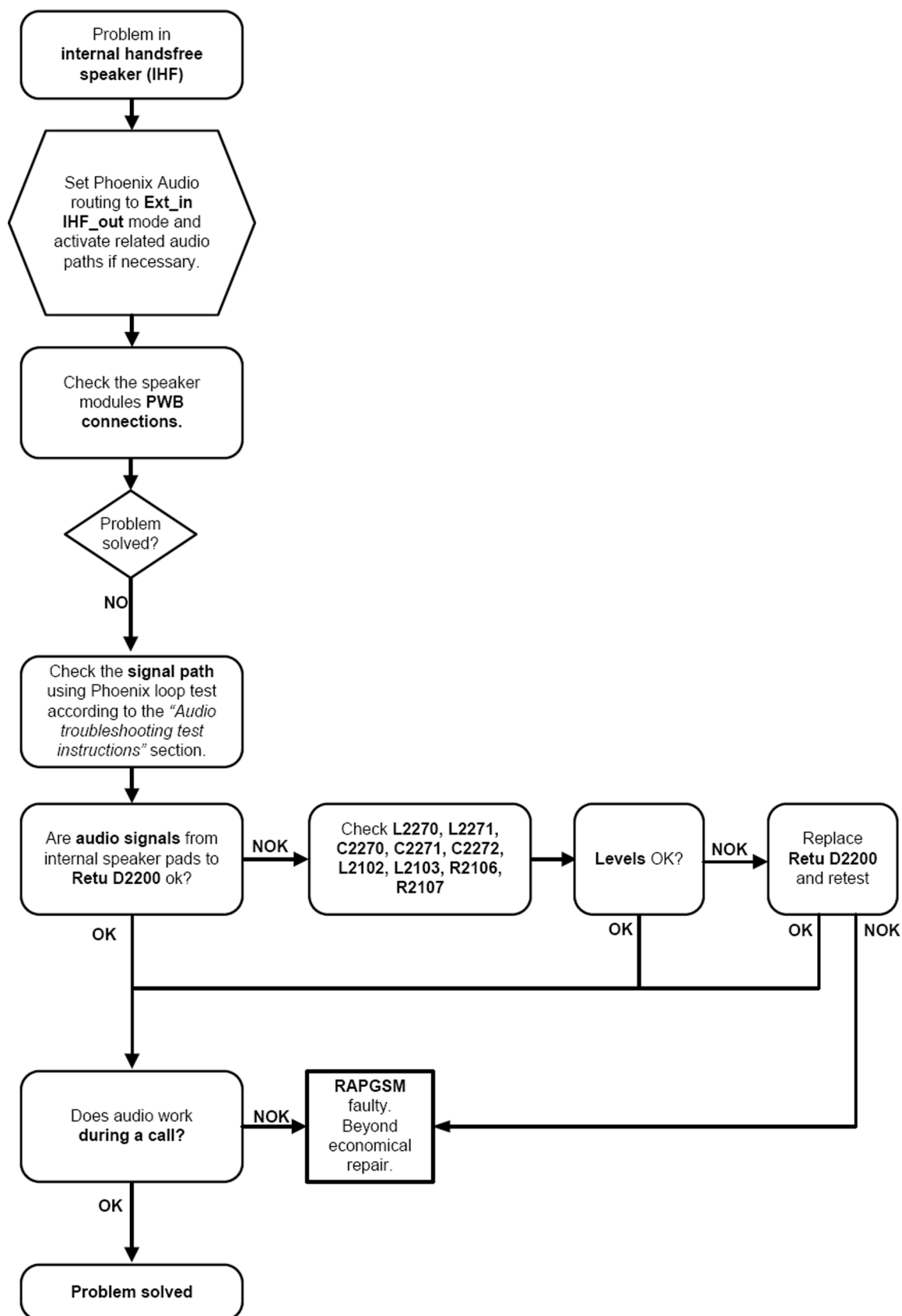
## IHF troubleshooting

### Troubleshooting flow



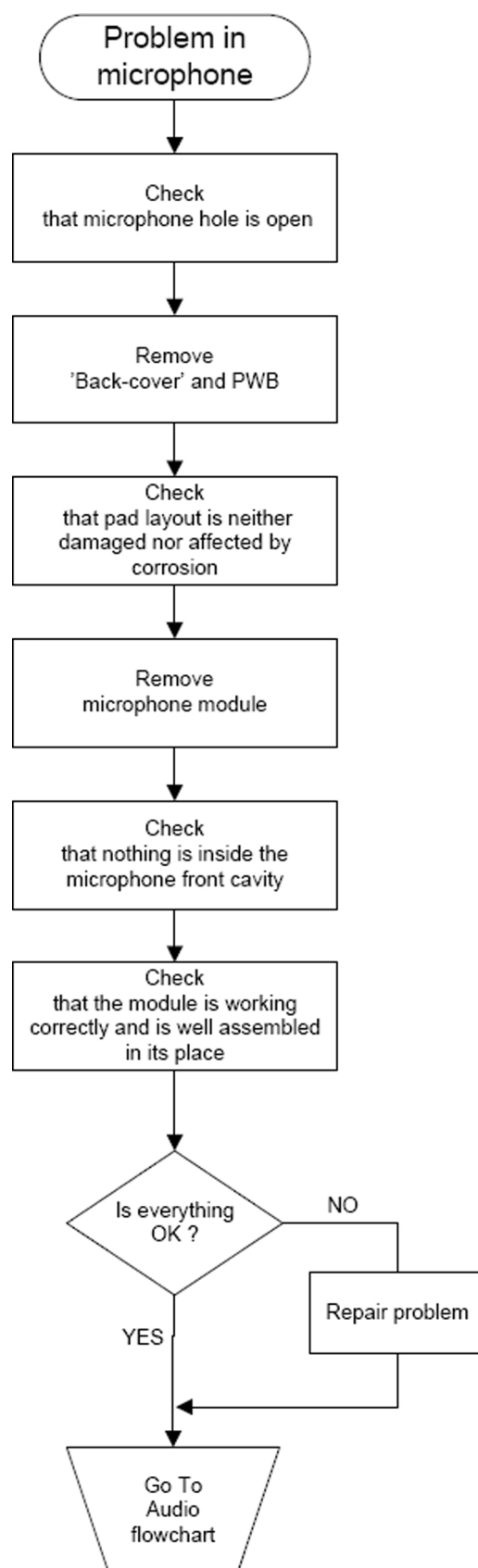
## IHF troubleshooting

### Troubleshooting flow



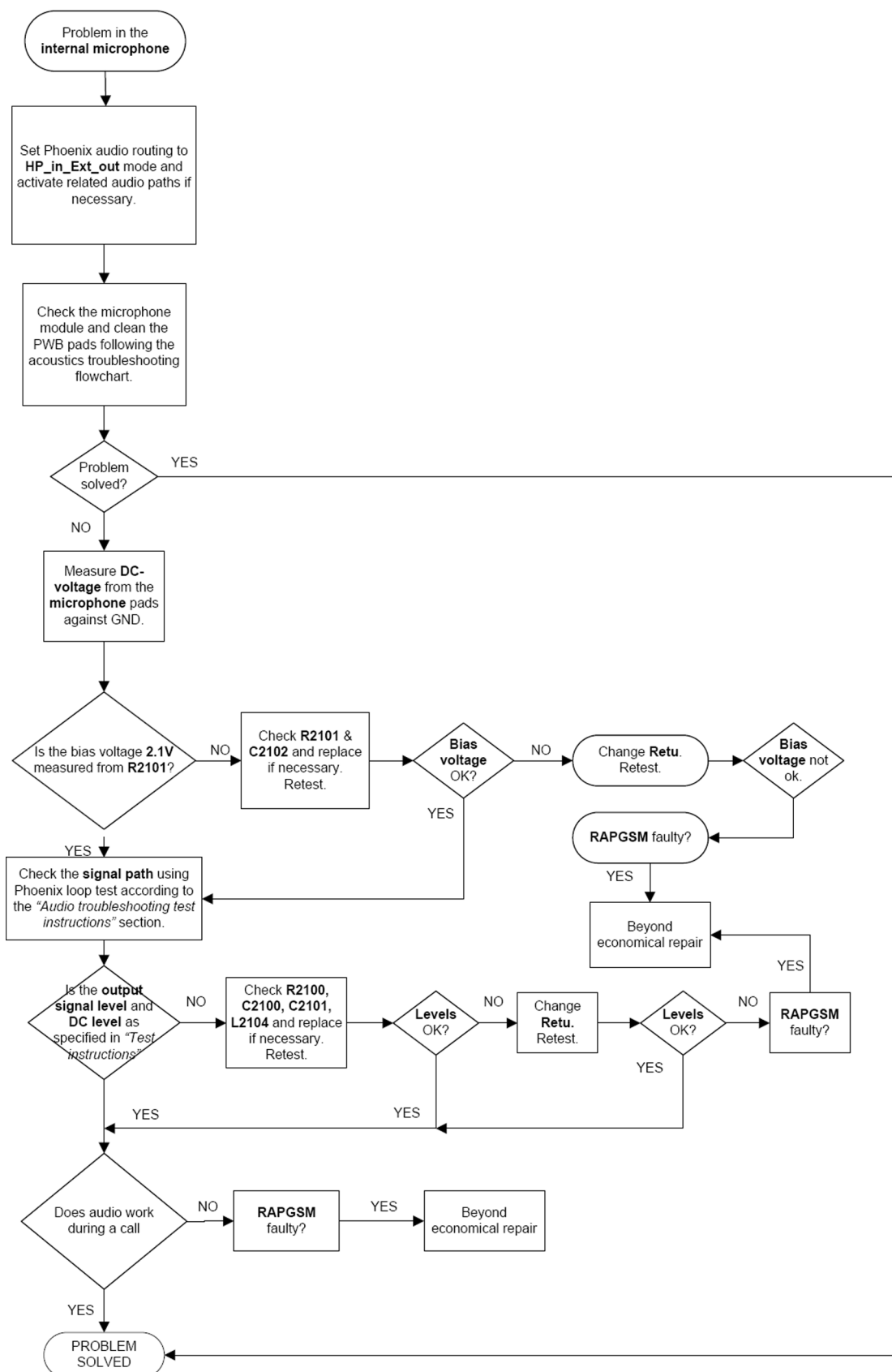
## Microphone troubleshooting

### Troubleshooting flow



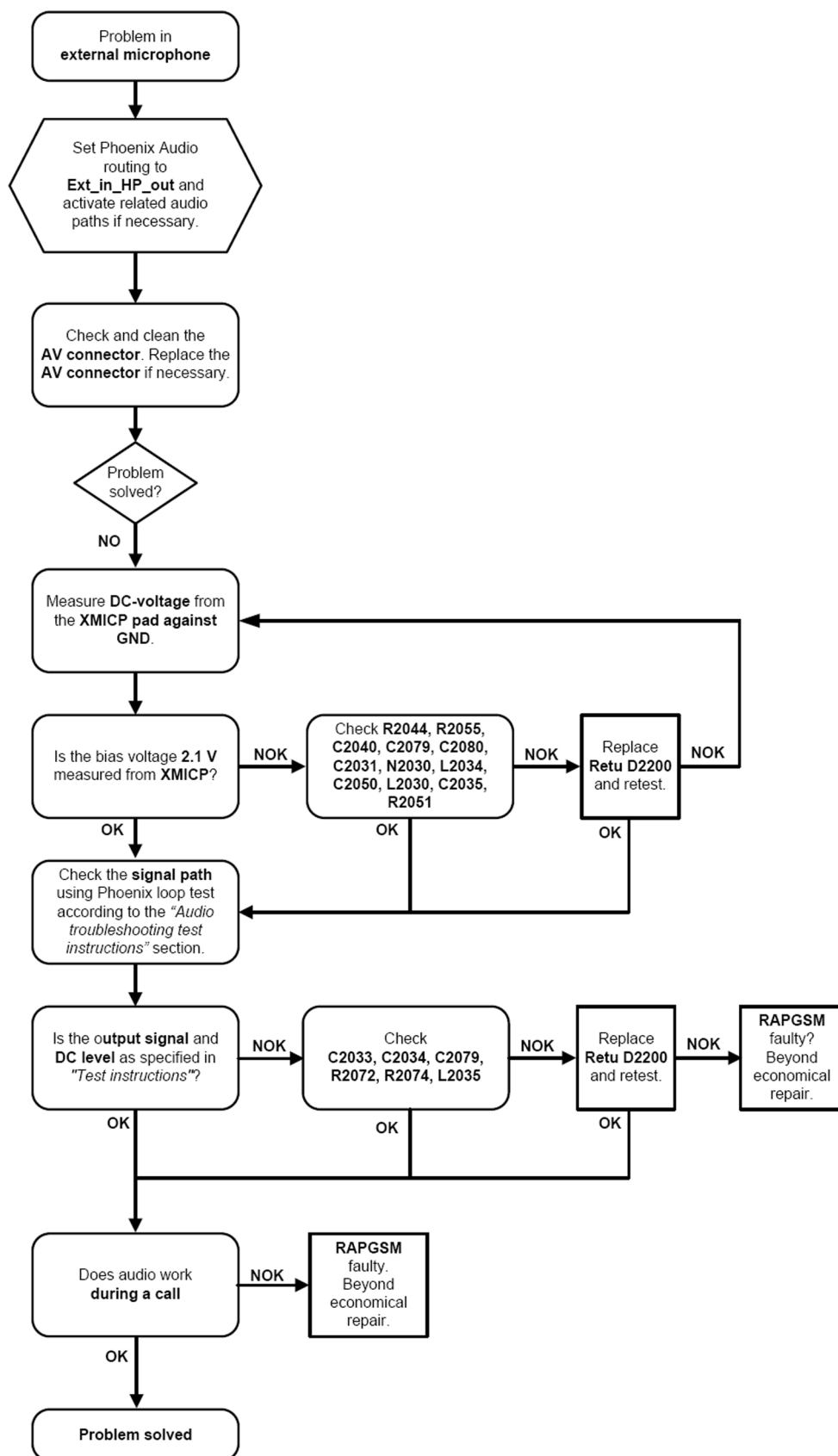
## Internal microphone troubleshooting

### Troubleshooting flow



## External headset microphone troubleshooting

### Troubleshooting flow



## ■ Connections troubleshooting

### Bluetooth troubleshooting

#### *Introduction to Bluetooth troubleshooting*

There are two main Bluetooth (BT) problems that can occur:

Problem	Description
Detachment of the BT antenna.	This would most likely happen if the device has been dropped repeatedly to the ground. It could cause the BT antenna to become loose or partially detached from the PWB.
A malfunction in the BT ASIC, BB ASICs or the phone's BT SMD components.	This is unpredictable and could have many causes i.e. SW or HW related.

The main issue is to find out if the problem is related to the BT antenna or related to the BT system or the phone's BB and then replace/fix the faulty component. For location of the antenna, please refer to the exploded view in the Parts and layouts section.

#### *Bluetooth settings for Phoenix*

##### Steps

1. Start *Phoenix* service software.
2. From the **File** menu, choose **Open Product**, and then choose the correct type designator from the **Product** list.
3. Place the phone to a flash adapter in the local mode.
4. Choose **Testing**→**Bluetooth LOCALS**.
5. Locate JBT-9's serial number (12 digits) found in the type label on the back of JBT-9.  
In addition to JBT-9, also SB-6, JBT-3 and JBT-6 Bluetooth test boxes can be used.
6. In the *Bluetooth LOCALS* window, write the 12-digit serial number on the **Counterpart BT Device Address** line.  
This needs to be done only once provided that JBT-9 is not changed.
7. Place the JBT-9 box near (within 10 cm) the BT antenna and click **Run BER Test**.

##### Results

Bit Error Rate test result is displayed in the *Bit Error Rate (BER) Tests* pane in the *Bluetooth LOCALS* window.

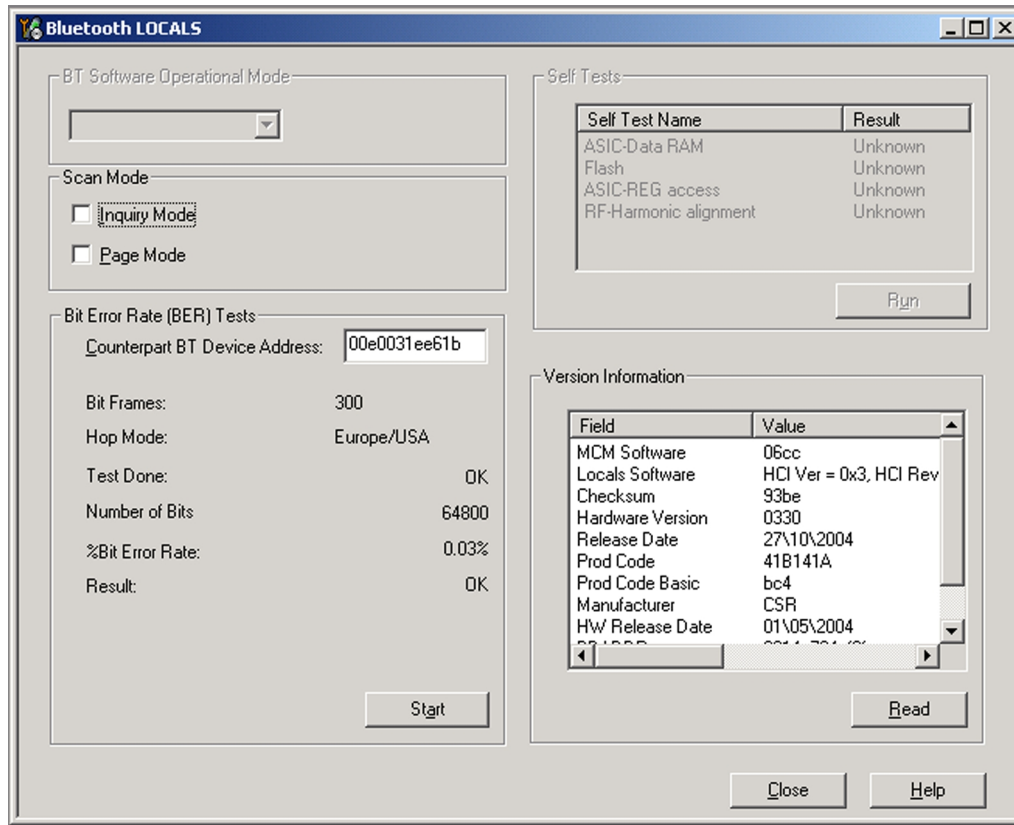


Figure 40 BER test result

### Bluetooth self tests in Phoenix

#### Steps

1. Start *Phoenix* service software.
2. Choose **File**→**Scan Product**.
3. Place the phone to a flash adapter.
4. From the **Mode** drop-down menu, set mode to **Local**.
5. Choose **Testing**→**Self Tests**.
6. In the *Self Tests* window check the following Bluetooth related tests:
  - **ST\_LPRF\_IF\_TEST**
  - **ST\_LPRF\_AUDIO\_LINES\_TEST**
  - **ST\_BT\_WAKEUP\_TEST**



7. To run the tests, click **Start**.

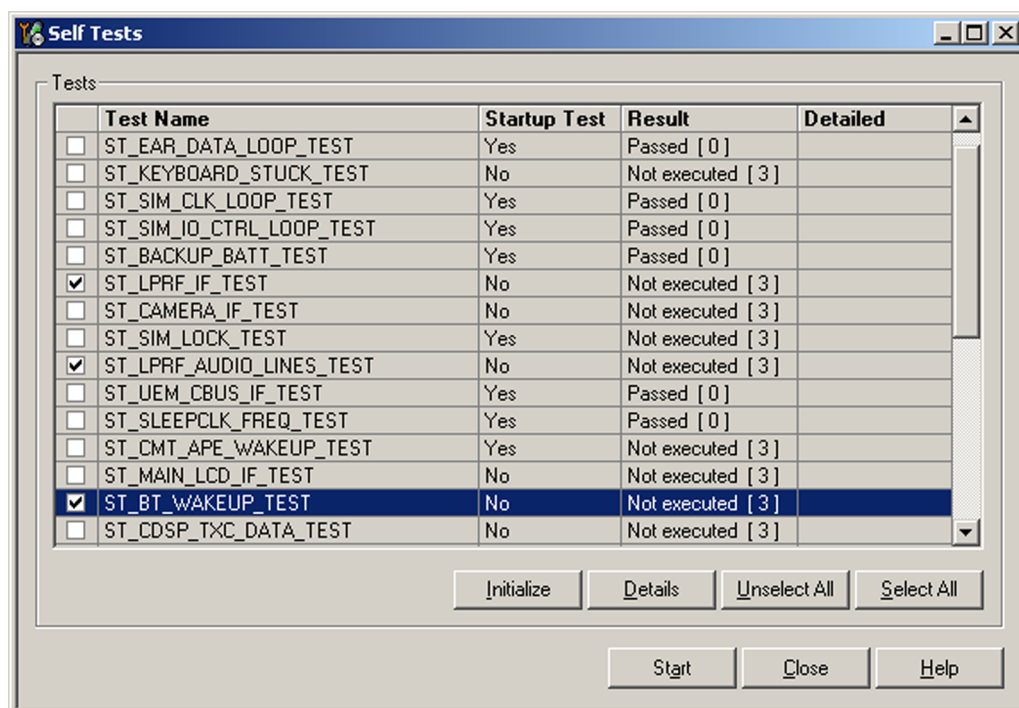


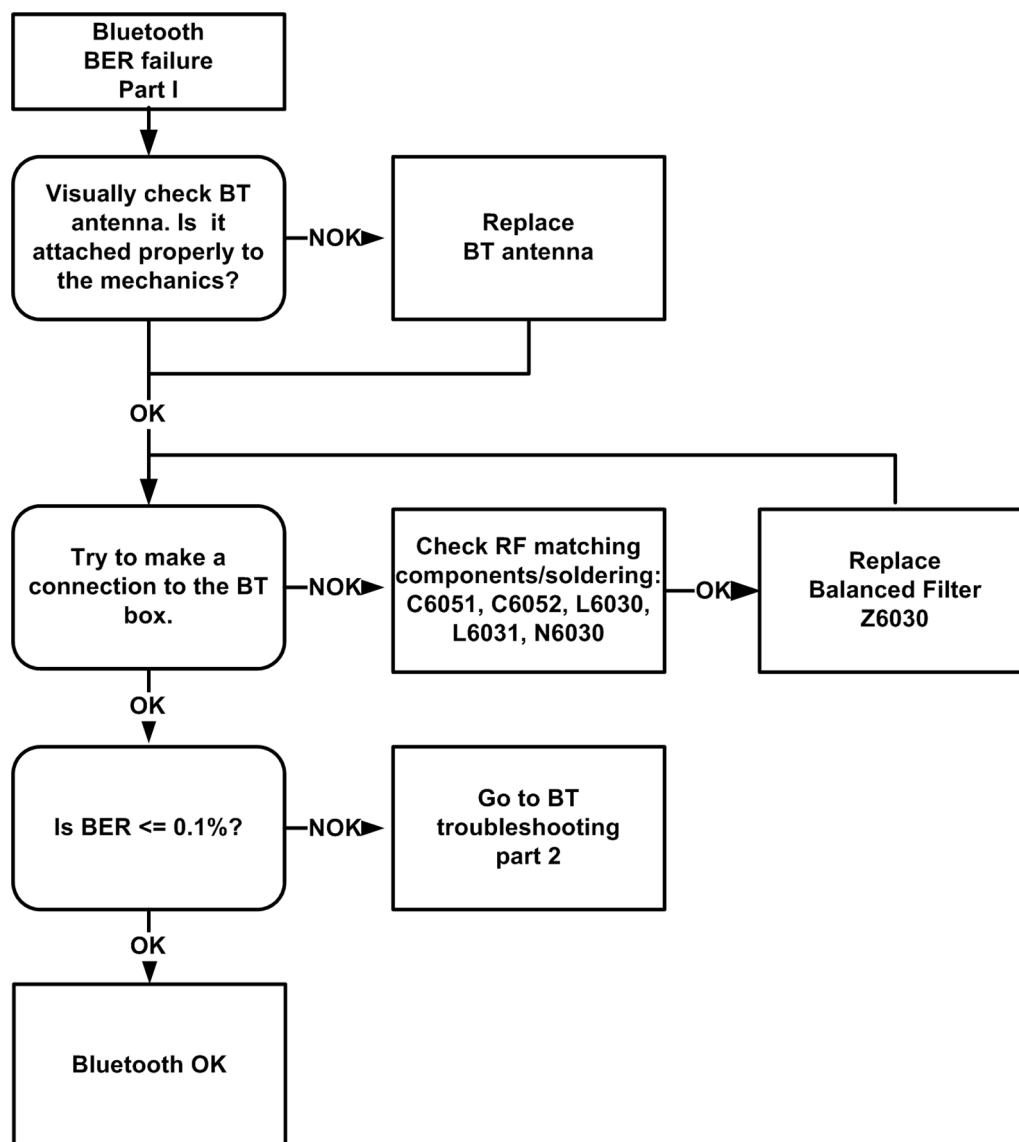
Figure 41 Bluetooth self tests in *Phoenix*

### **Bluetooth BER failure troubleshooting**

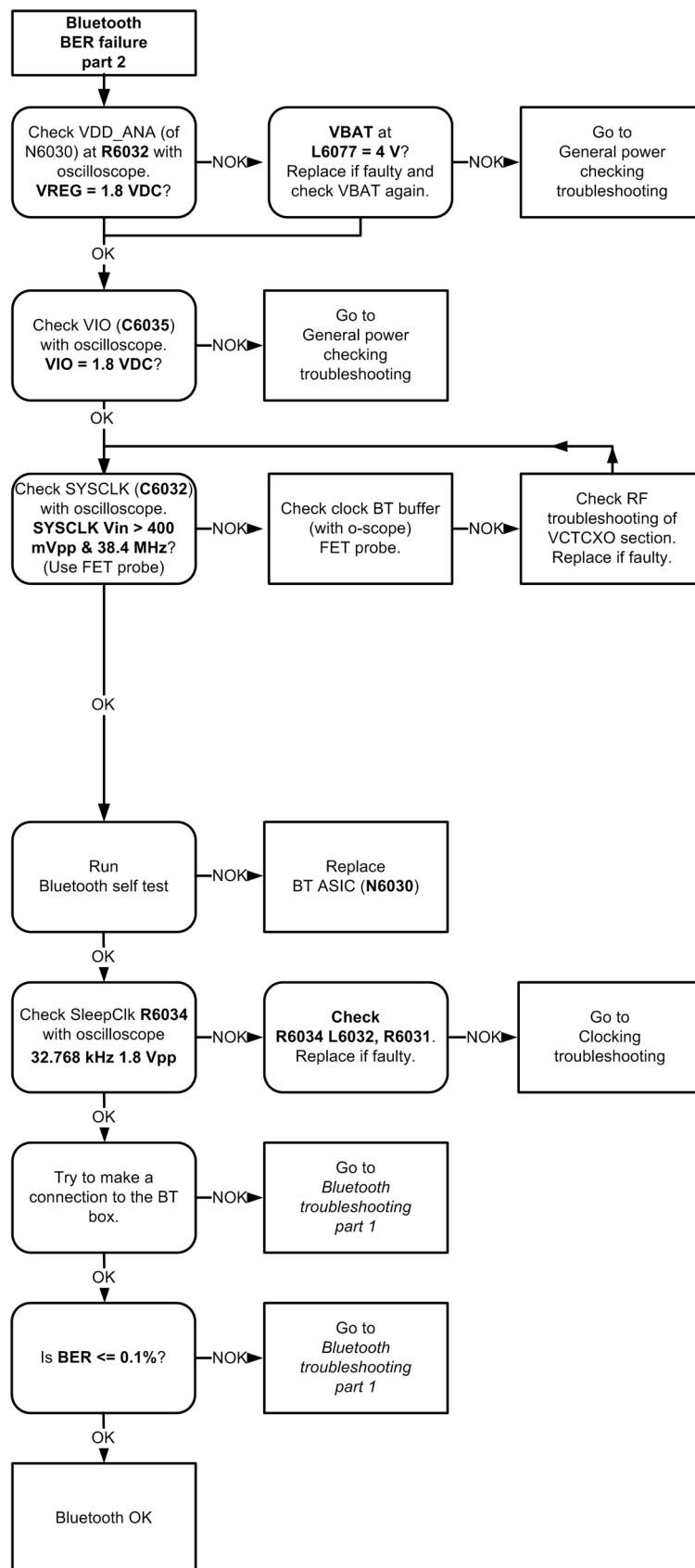
#### **Context**

Basic encoding rules, BER, is a self-identifying and self-delimiting encoding scheme, which means that each data value can be identified, extracted and decoded individually.

## Part 1: Bluetooth self test passed but BER test failed

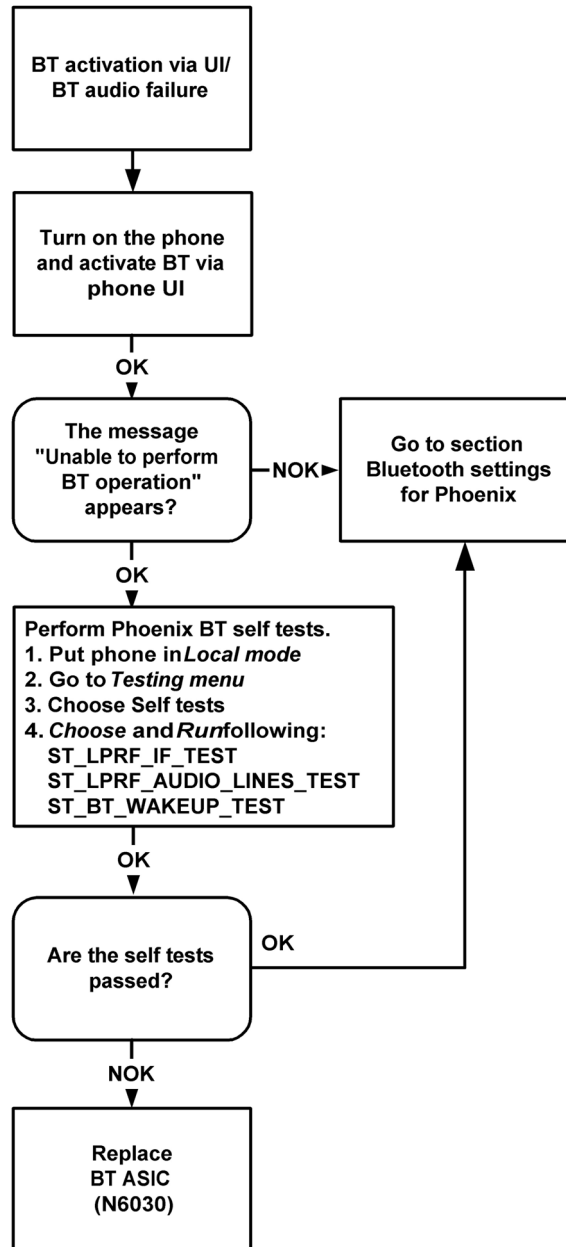


## Part 2: Bluetooth self test failed



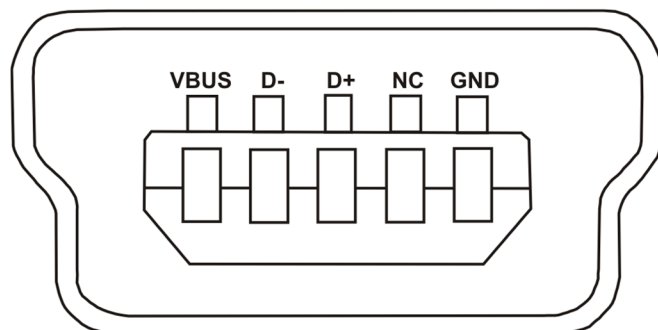
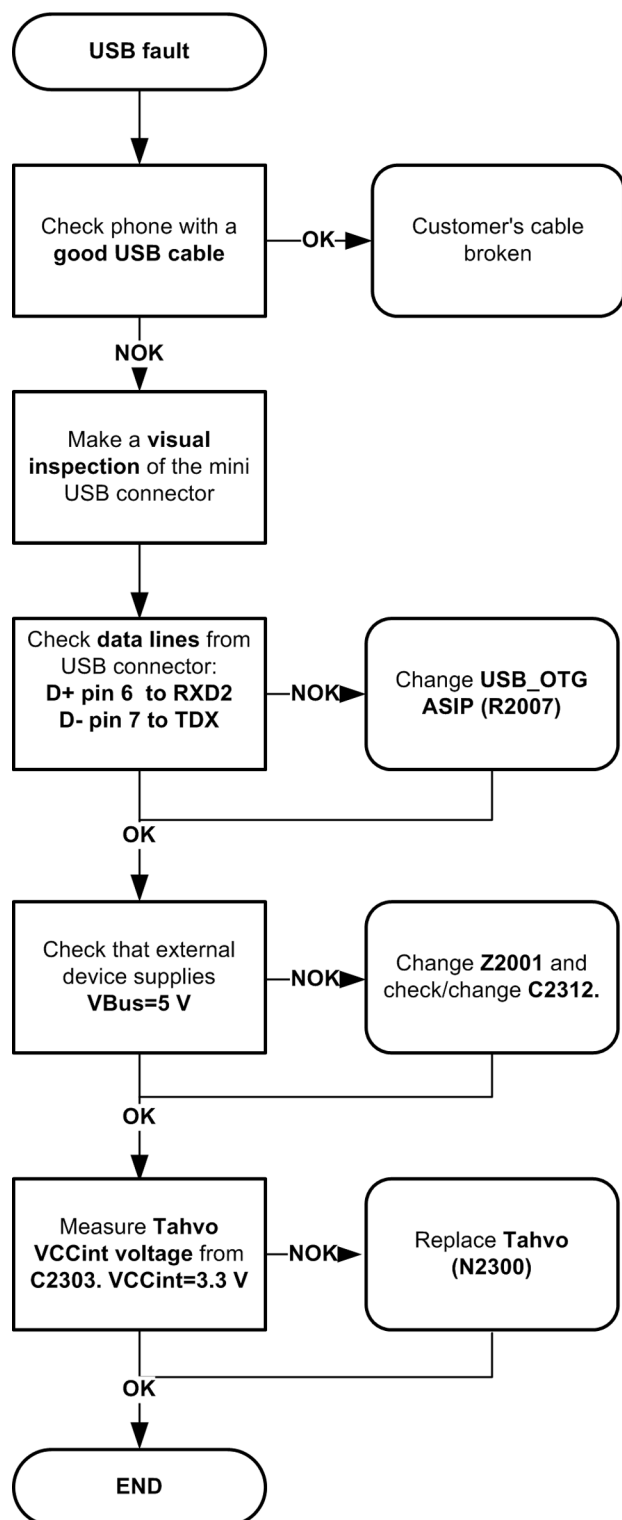
## Bluetooth audio and UI activation troubleshooting

### Troubleshooting flow



## USB interface troubleshooting

### Troubleshooting flow



## ■ Baseband manual tuning guide

### Certificate restoring for BB5 products

#### Context

This procedure is performed when the device certificate is corrupted for some reason.

All tunings (RF & Baseband, UI) must be done after performing the certificate restoring procedure.

The procedure for certificate restoring is the following:

- Flash the phone with the latest available software using FPS-8 or FPS-10.
- Create a request file.
- Send the file to Nokia by e-mail. Use the following addresses depending on your location:
  - APAC: sydney.service@nokia.com
  - CHINA: repair.ams@nokia.com
  - E&A: salo.repair@nokia.com
  - AMERICAS: fls1.usa@nokia.com
- When you receive a reply from Nokia, carry out certificate restoring.
- Tune the phone completely.

**Note:** SX-4 smart card is needed.

- If the phone resets after certificate restoring, reflash the phone again.

Required equipment and setup:

- *Phoenix* service software v 2004.39.7.70 or newer.
- The latest phone model specific *Phoenix* data package.
- PKD-1 dongle
- SX-4 smart card (Enables BB5 testing and tuning features)
- External smart card reader

**Note:** The smart card reader is only needed when FPS-8 is used. FPS-10 has an integrated smart card reader.

- Activated FPS-8 flash prommer **OR** FPS-10 flash prommer
- Flash update package 03.18.004 or newer for FPS-8 or FPS-10 flash prommers
- CU-4 control unit
- USB cable from PC USB Port to CU-4 control unit
- Phone model specific adapter for CU-4 control unit
- PCS-1 cable to power CU-4 from external power supply
- XCS-4 modular cable between flash prommer and CU-4

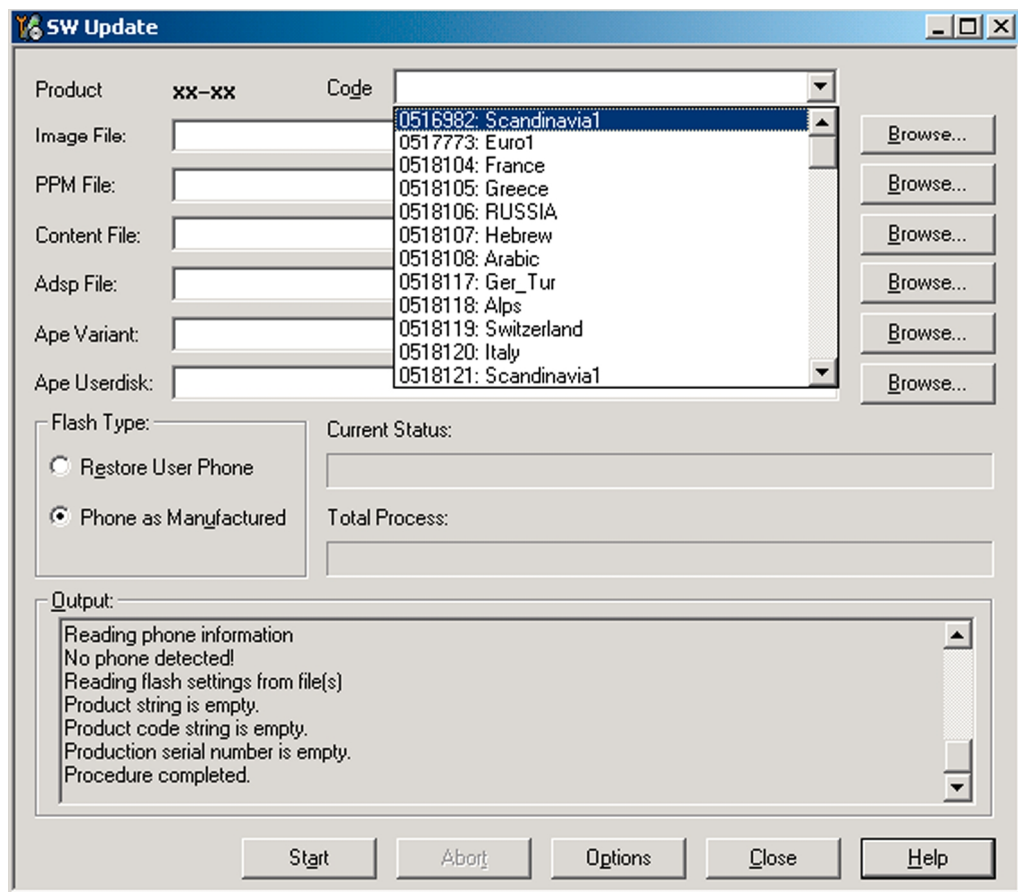
**Note:** CU-4 must be supplied with +12 V from an external power supply in all steps of certificate restoring.

#### Steps

1. Program the phone software.
  - i Start *Phoenix* and login. Make sure the connection has been managed correctly for FPS-8 or FPS-10.
  - ii Update the phone MCU software to the latest available version.

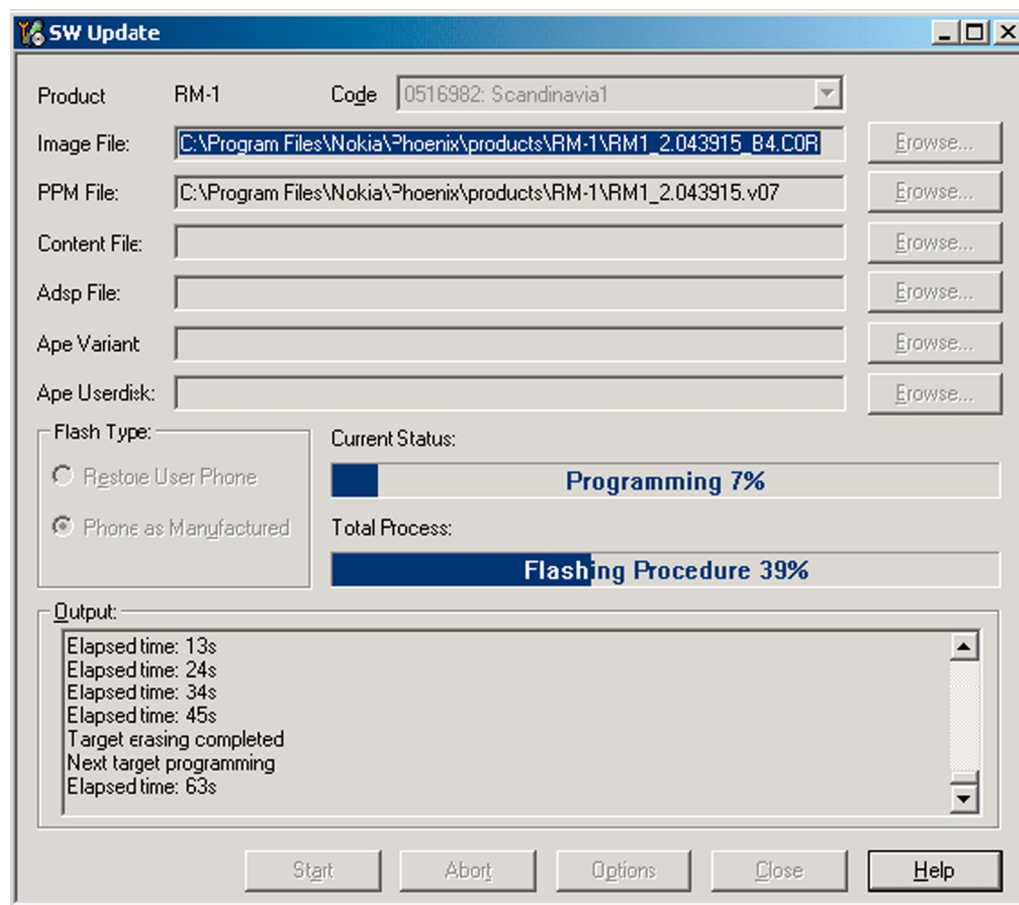
If the new flash is empty and the phone cannot communicate with *Phoenix*, reflash the phone.

- iii Choose the product manually from **File**→**Open Product** , and click **OK**.  
Wait for the phone type designator (e.g. "RM-1" ) to be displayed in the status bar.
- iv Go to **Flashing**→**SW Update** and wait until *Phoenix* reads the product data as shown in the following picture.



<b>Product</b>	is automatically set according to the phone support module which was opened manually, but the flash files cannot be found because the correct data cannot be read from the phone automatically.
<b>Code</b>	must be chosen manually, it determines the correct flash files to be used. Please choose the correct product code (can be seen in the phone type label) from the dropdown list.
<b>Flash Type</b>	must be set to <b>Phone as Manufactured</b> .

- v To continue, click **Start**.  
Progress bars and messages on the screen show actions during phone programming, please wait.



Programming is completed when *Flashing Completed* message is displayed.

The product type designator and MCU SW version are displayed in the status bar.

vi Close the *SW Update* window and then choose **File**→**Close Product**.

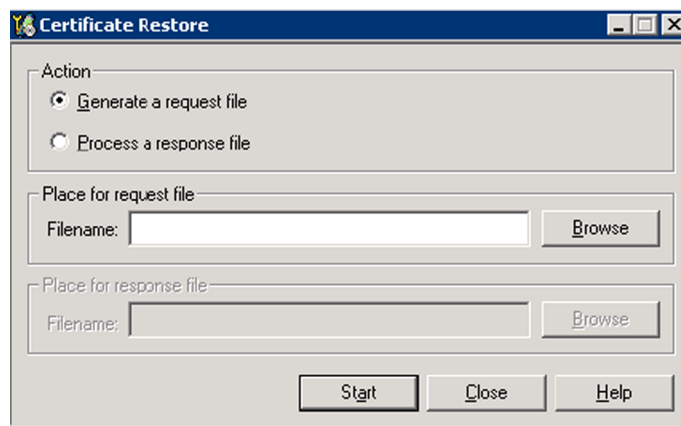
## 2. Create a *Request* file.

For this procedure, you must supply +12 V to CU-4 from an external power supply.

i To connect the phone with *Phoenix*, choose **File**→**Scan Product**.

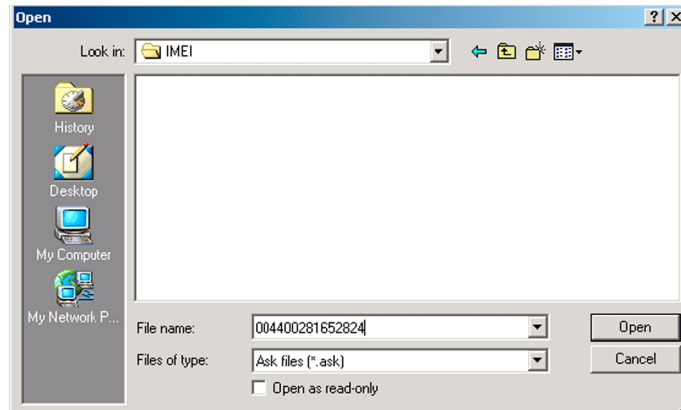
ii Choose **Tools**→**Certificate Restore**.

iii To choose a location for the request file, click **Browse**.

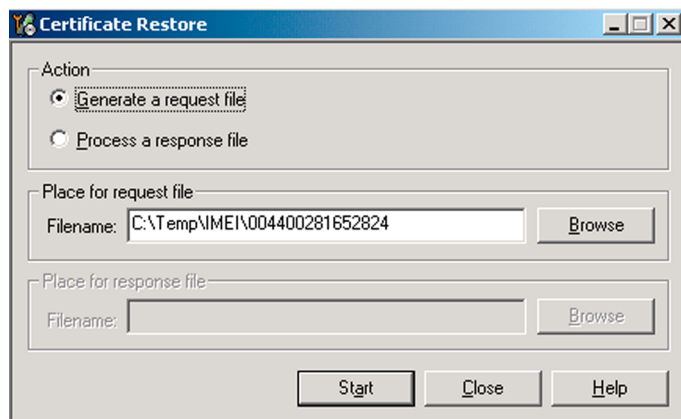




- iv Name the file so that you can easily identify it, and click **Open**.

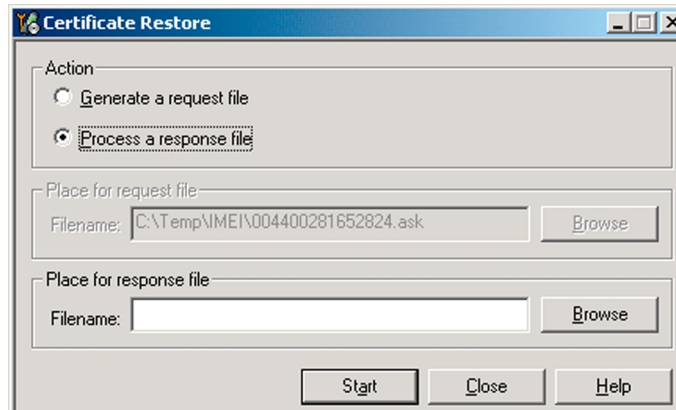


The name of the file and its location are shown.

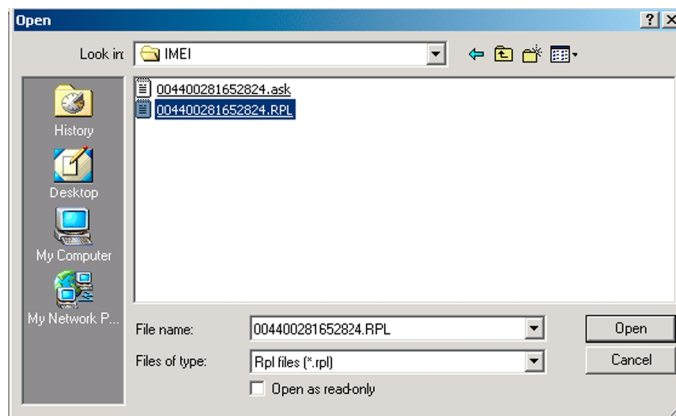


- v To create the *Request* file, click **Start**.
  - vi When the file for certificate restore has been created, send it to Nokia as an e-mail attachment.
3. Restore certificate.
- For this procedure, you must supply +12 V to CU-4 from an external power supply.
- i Save the reply file sent by Nokia to your computer.
  - ii Start *Phoenix* service software.
  - iii Choose **File**→**Scan Product**.

- iv From the **Tools** menu, choose **Certificate Restore** and select **Process a response file** in the *Action* pane.

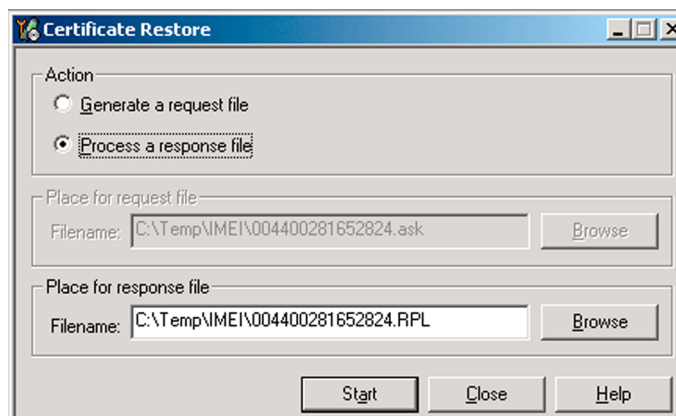


- v To choose the location where response file is saved, click **Browse**.
- vi Click **Open**.



The name of the file and the path where it is located are shown.

- vii To write the file to phone, click **Start**.



## Next actions

After a successful rewrite, you must retune the phone completely by using *Phoenix* tuning functions.

**Important:** Perform all tunings: RF, BB, and UI.

## Energy management calibration

### Prerequisites

Energy Management (EM) calibration is performed to calibrate the setting (gain and offset) of AD converters in several channels (that is, **battery voltage**, **BSI**, **battery current**) to get an accurate AD conversion result.

Hardware setup:

- An external power supply is needed.
- Supply 12V DC from an external power supply to CU-4 to power up the phone.
- The phone must be connected to a CU-4 control unit with a product-specific flash adapter.

### Steps

1. Place the phone to the docking station adapter (CU-4 is connected to the adapter).
2. Start *Phoenix* service software.
3. Choose **File**→**Scan Product**.
4. Choose **Tuning**→**Energy Management Calibration**.
5. To show the current values in the phone memory, click **Read**, and check that communication between the phone and CU-4 works.
6. Check that the **CU-4 used** check box is checked.
7. Select the item(s) to be calibrated.

**Note:** ADC calibration has to be performed before other item(s). However, if all calibrations are selected at the same time, there is no need to perform the ADC calibration first.

8. Click **Calibrate**.

The calibration of the selected item(s) is carried out automatically.

The candidates for the new calibration values are shown in the *Calculated values* column. If the new calibration values seem to be acceptable (please refer to the following "Calibration value limits" table), click **Write** to store the new calibration values to the phone permanent memory.

Table 11 Calibration value limits

Parameter	Min.	Max.
ADC Offset	-20	20
ADC Gain	12000	14000
BSI Gain	1100	1300
VBAT Offset	2400	2650
VBAT Gain	19000	23000
VCHAR Gain	N/A	N/A
IBAT (ICal) Gain	7750	12250

9. Click **Read**, and confirm that the new calibration values are stored in the phone memory correctly. If the values are not stored to the phone memory, click **Write** and/or repeat the procedure again.
10. To end the procedure, close the *Energy Management Calibration* window.

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## **7 — RF Troubleshooting and Manual Tuning Guide**

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## ■ Introduction to RF troubleshooting

On the following pages you will find a step-by-step troubleshooting procedure and reference measurements at the relevant signal points. For functional descriptions, please refer to the System module section.

### Notes on reference measurements

All measurements must be done using:

- spectrum analyser with a high-frequency high-impedance passive probe (LO-/reference frequencies and RF power levels)
- oscilloscope with a 10:1 probe (DC-voltages and low frequency signals)

**Important:** All measurements with an RF coupler must be performed in an RF shielded environment, or where there are no transmissions on the same frequencies. This may disturb sensitive receiver measurements.

### Repairing this phone - important

The RF section of the phone is built around one RF ASIC. Before changing the RF ASIC, please make sure that supply voltages and serial communication coming from baseband to RF are OK.

Please note that the grounding of the FEM module is directly below the FEM module. Therefore, it is difficult to check or change the module.

Most RF semiconductors are static discharge sensitive! ESD protection must be taken care of during repair (ground straps and ESD soldering irons). The RF ASIC and FEM are moisture sensitive, so parts must be pre-baked prior to soldering.

In addition to key components, there are lot of discrete components (resistors, inductors and capacitors) which troubleshooting is done mainly by checking if the soldering of the component is done properly.

Capacitor can be checked for shorts and resistors for value by means of an ohmmeter, but be aware in-circuit measurements should be evaluated carefully.

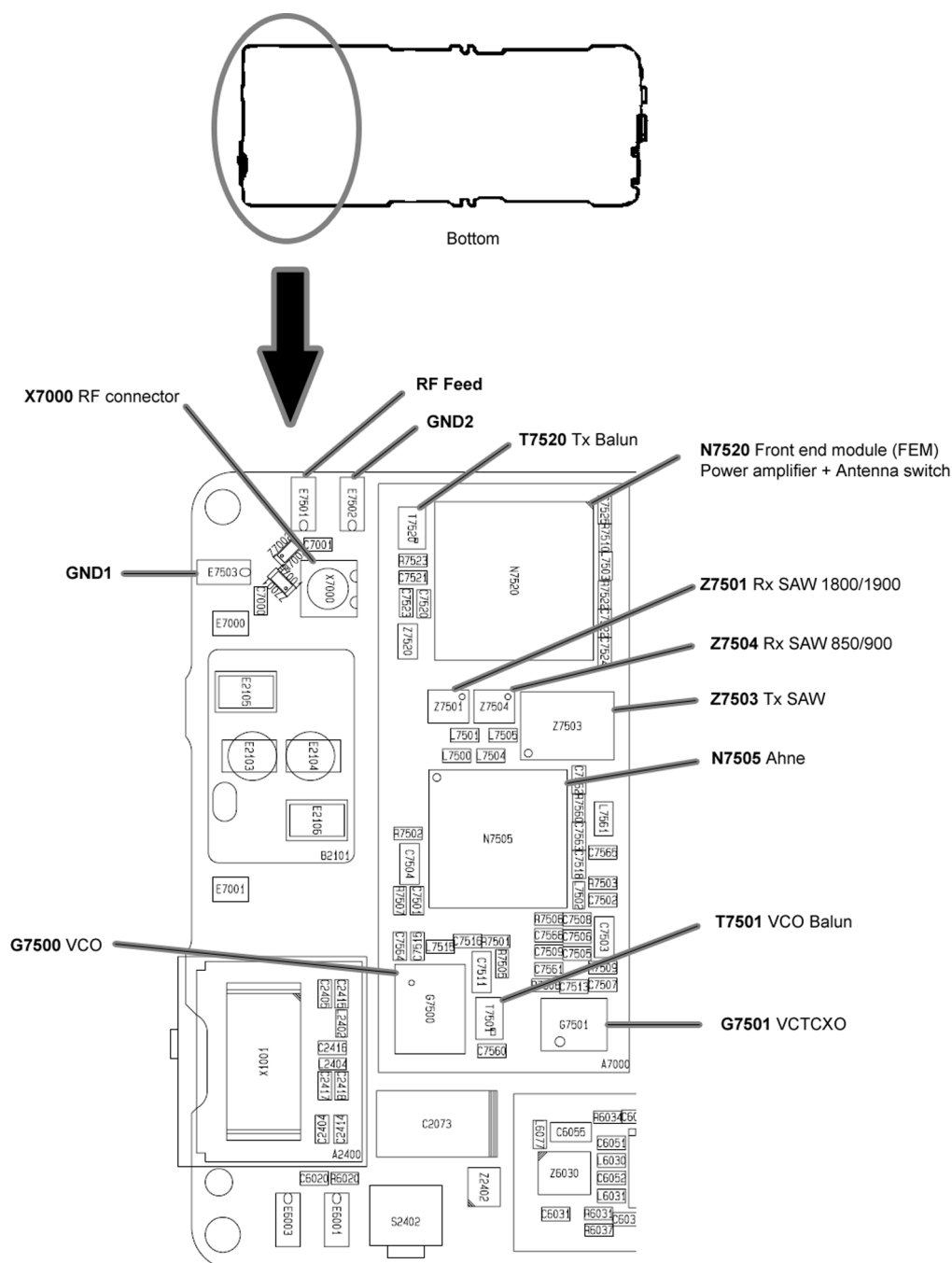
Keep in mind that all measured voltages or RF levels depicted in the service manual are rough figures. Especially RF levels vary because of different measuring equipment or different grounding of the probe used.

When using an RF probe, use a pair of metallic tweezers to connect the probe ground to the PWB ground as close to the measurement point as possible. If measurements are performed in a product specific module jig, then "GND" pads should be used for the probe ground.

### Supported bands

RM-237 supports GSM900, GSM1800 and GSM1900.

Make sure to investigate only the bands, which the phone is made for.



In GSM, the input signal can be either a real GSM signal or a CW signal that is 67.771kHz up from the carrier frequency.

For service tool usage instructions, refer to section Service Tools and Service Concepts.

## General instructions for RX troubleshooting

### Steps

1. Connect a test jig to a computer with a DAU-9S cable or to a FPS-10 flash prommer with a modular cable (XCS-4).

Make sure that you have a PKD-1 dongle connected to the computer's parallel port.

2. Connect CU-4 with 12 V supply. The DC supply voltage is set to 3.7 V by default (in Phoenix).
3. Connect an RF cable between the RF connector of the module test jig (MJ-122) and measurement equipment or alternatively use a 50  $\Omega$  (at least 2 W) dummy load in the module test jig RF connector, otherwise the RF part may be damaged.

**Note:** Make sure that all connections are made to the correct RF connector.

4. Set Rx on.
  - i Set the phone module to the test jig and start *Phoenix service software*.
  - ii Initialize connection to the phone. (With the FPS-10 prommer use FPS10\_USB or FPS10\_TCP drivers, depending on connection type. When using DAU-9S select FBUS).
  - iii From the File menu, choose product: **File -> Choose Product -> xx-x\*** (\* = type designator of the phone, eg. RM-237), or press **Ctrl + R** to scan product.
  - iv From the toolbar, set operating mode to "Local".
5. EGSM900/1800/1900 troubleshooting
  - i From the Testing menu, activate the *RF Controls* window: **Testing -> GSM -> RF Controls**.



- ii In the *RF Controls* window:
  - Select band.
  - Set Active unit to "Rx" (Default ).
  - Set Operation mode to "Burst" (Default).
  - Set Rx/Tx channel (see table below).
  - Apply a frequency (see table below) to the RF-connector.

**Note:** Remember to compensate for cable attenuation, specific for MJ-122. You will find the values in the Service tools section.

Apply a signal to the RF-connector (remember to compensate for cable attenuation). See values in the table below.

Band	Channel (RX and TX)	Input frequency (MHz)	Offset (kHz)	Power level (dBm)
GSM900	37	942.46771	67.710	-90
GSM1800	700	1842.86771	67.710	-90
GSM1900	661	1960.06771	67.710	-90

The screenshot shows the 'RF Controls' window with the following settings:

- Common GSM RF Control Values:**
  - Active Unit: Rx
  - Rx/Tx Channel: 37 (942.400000)
  - Band: GSM 900
  - AFC: 0
  - Operation Mode: Burst
- RX Control Values:**
  - Monitor Channel: 37 (942.400000)
  - AGC: 22
- TX Control Values:**
  - Edge: Off
  - Tx Data Type: All 1
  - Tx PA Mode: High
  - Tx Power Level: 5

Buttons at the bottom: Close, Help

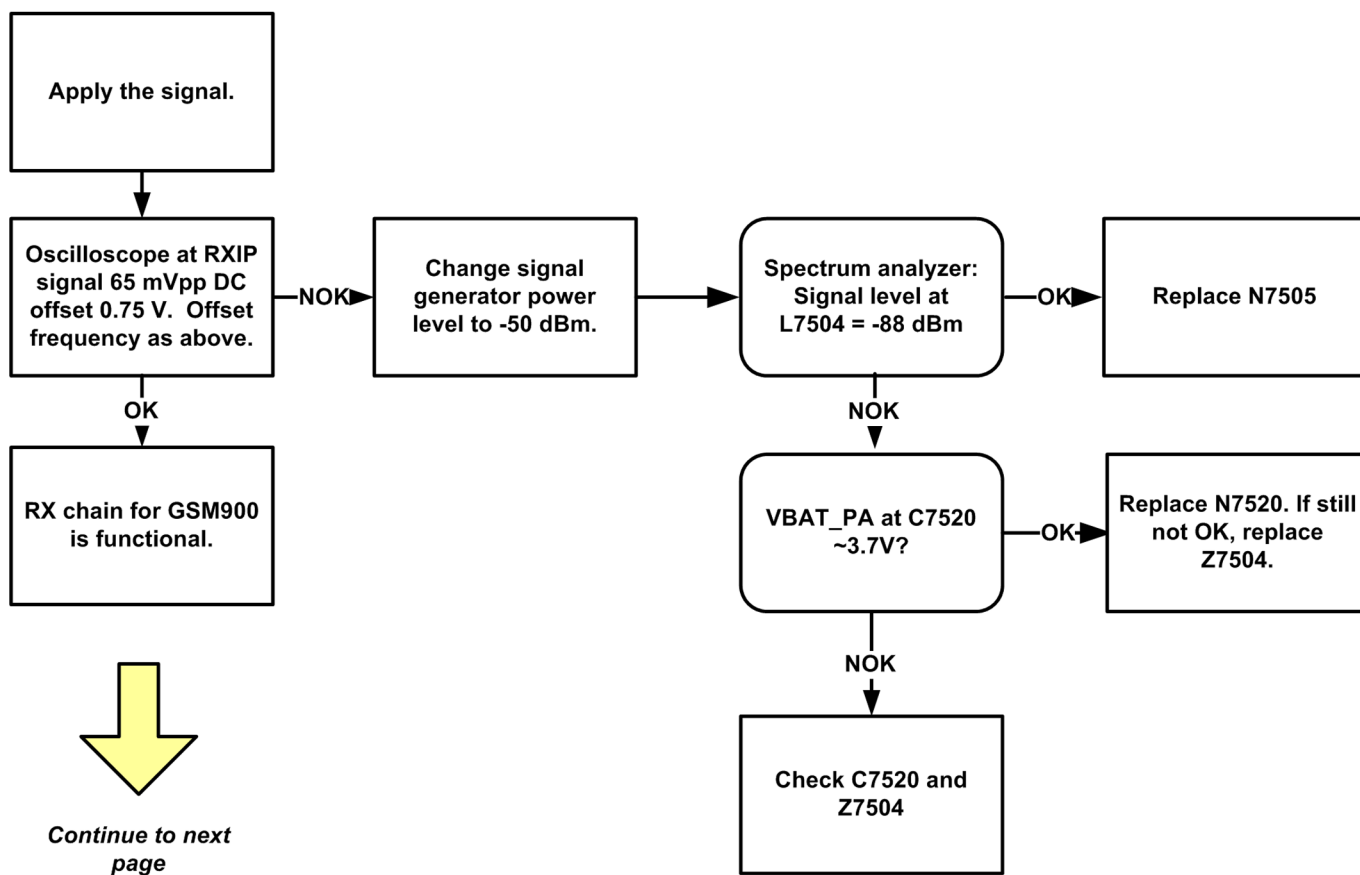
Figure 43 RF Controls window

## Receiver (RX) troubleshooting

### Receiver troubleshooting

Apply a signal according to the table in [General instructions for RX troubleshooting \(page \)](#)

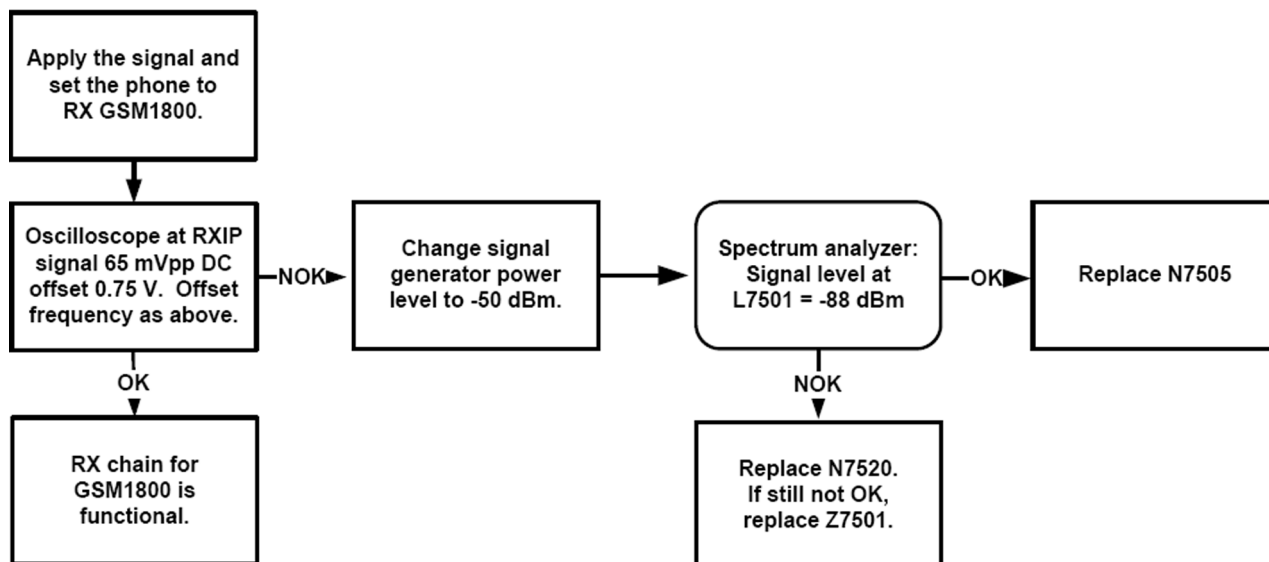
### GSM900



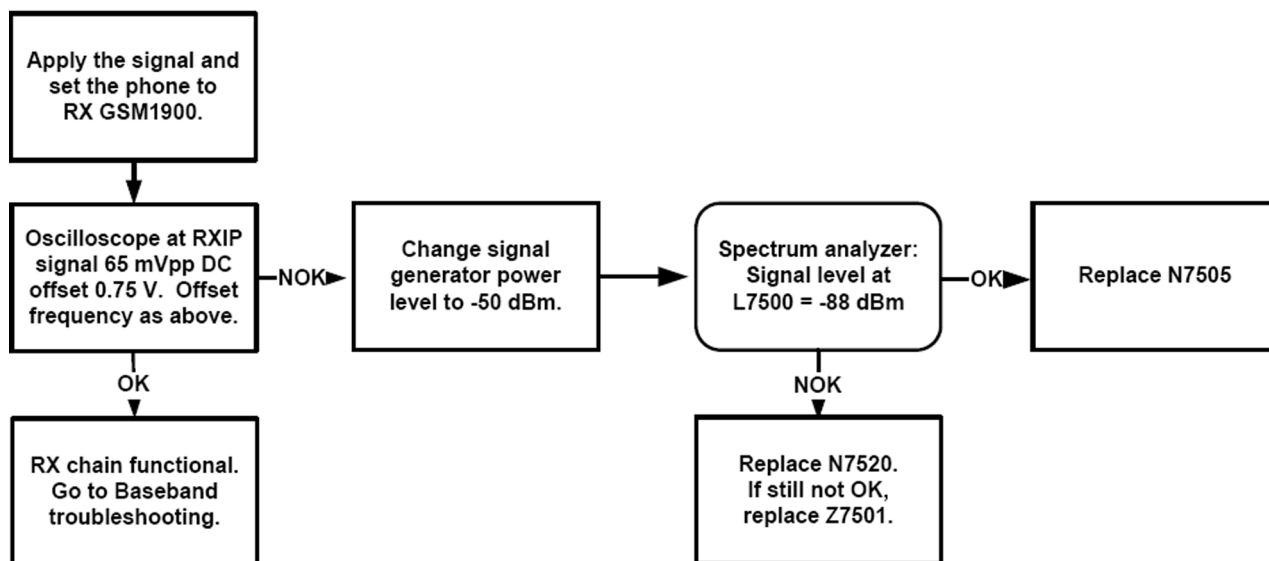
Continued from  
previous page



### GSM1800



### GSM1900



## GSM Rx chain activation for manual measurements / GSM RSSI measurement

### Context

RSSI signal measurement is the main Rx troubleshooting measurement. The test measures the strength of the received signal.

I and Q branches can be measured separately. In GSM, the input signal can be either a real GSM signal or a CW (Continuous Wave) signal that is 67.771 kHz above the carrier frequency.

### Steps

1. Start *Phoenix* service software.
2. Choose **Testing**→**GSM**→**RSSI Reading**.
3. Set the RF signal generator for a channel frequency +67.771 kHz in CW mode with a -80 dBm signal level. Alternatively set the cellular tester downlink channel to the appropriate channel. Make sure that the tester is set to continuous mode, not to burst mode.
4. In the *RSSI Reading* window, select the appropriate band and channel.

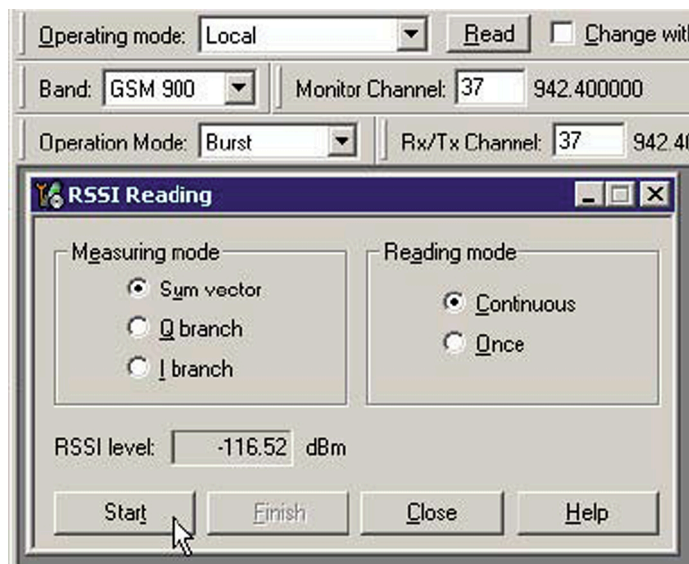


Figure 44 *RSSI Reading* window

5. To start the measurement, activate GSM Rx chain, click **Start**.

### Results

RSSI reading values of the selected band and channel are displayed. The RSSI level must be the same value as that which is set at the signal generator (-80 dBm).

## ■ Transmitter troubleshooting

### General instructions for TX troubleshooting

#### Context

- Tx troubleshooting requires Tx operation.
- Do not transmit on frequencies that are in use!
- Transmitter can be controlled in the local mode for diagnostic purposes.
- The most useful Phoenix tool for GSM transmitter testing is "RF Controls".



- Tx IQ tuning and Tx power tuning can be also used in some cases.
- Remember that retuning is not a fix! Phones are tuned correctly in production.

The first set of steps instructs how to assemble the test setup. This setup is general for all Tx troubleshooting tasks.

Alternative steps provide specific troubleshooting instructions for *Phoenix* service software.

**Caution:** Never activate the GSM transmitter without a proper antenna load. There should be always 50  $\Omega$  load connected to the RF connector (antenna, RF-measurement equipment or at least 2 W dummy load), otherwise the GSM Power amplifier may be damaged.

## Steps

1. Connect a test jig to a computer with a DAU-9S cable or to a FPS-10 flash prommer with a modular cable (XCS-4).

Make sure that you have a PKD-1 dongle connected to the computer's parallel port.

2. Connect CU-4 with 12 V supply. The DC supply voltage is set to 3.7 V by default (in Phoenix).
3. Connect an RF cable between the RF connector of the module test jig (MJ-122) and measurement equipment or alternatively use a 50  $\Omega$  (at least 2 W) dummy load in the module test jig RF connector, otherwise GSM may be damaged.

**Note:** There are two antenna connectors in the module jig:

- one for GSM
- one for Bluetooth

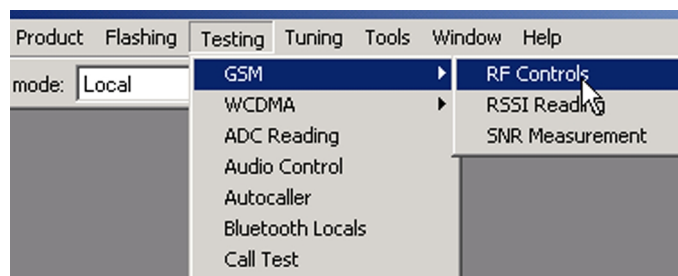
Make sure that all connections are made to the correct RF connector.

Normally a spectrum analyser is used as measurement equipment.

**Note:** The maximum input power of a spectrum analyser is +30 dBm.

To prevent any damage, it is recommended to use 10 dB attenuator on the spectrum analyzer input.

4. Set Tx on.
  - i Set the phone module to the test jig and start *Phoenix service software*.
  - ii Initialize connection to the phone. (With the FPS-10 prommer use FPS10\_USB or FPS10\_TCP drivers, depending on connection type. When using DAU-9S select FBUS driver).
  - iii From the File menu, choose product: **File -> Choose Product -> xx-x\*** (\* = type designator of the phone, e.g. RM-237), or press **Ctrl + R** to scan product.
  - iv From the toolbar, set operating mode to "Local".
5. GSM900/1800/1900 troubleshooting
  - i From the Testing menu, activate the *RF Controls* window: **Testing -> GSM -> RF Controls**.



- ii In the *RF Controls* window:
  - Select band "GSM900" or "GSM1800" or "GSM1900".
  - Set Active unit to "Tx" (Default = "Rx").



- Set Operation mode to "Burst" (Default).
- Set Tx data type to "All1" (Default).
- Set Rx/Tx channel (see table below)
- Set Edge to "Off" (Default).
- Set Tx PA mode to "High" (Default).
- Set power level (see table below)

Band	Channel (RX and TX)	TX power level
GSM900	37	5
GSM1800	700	0
GSM1900	661	0

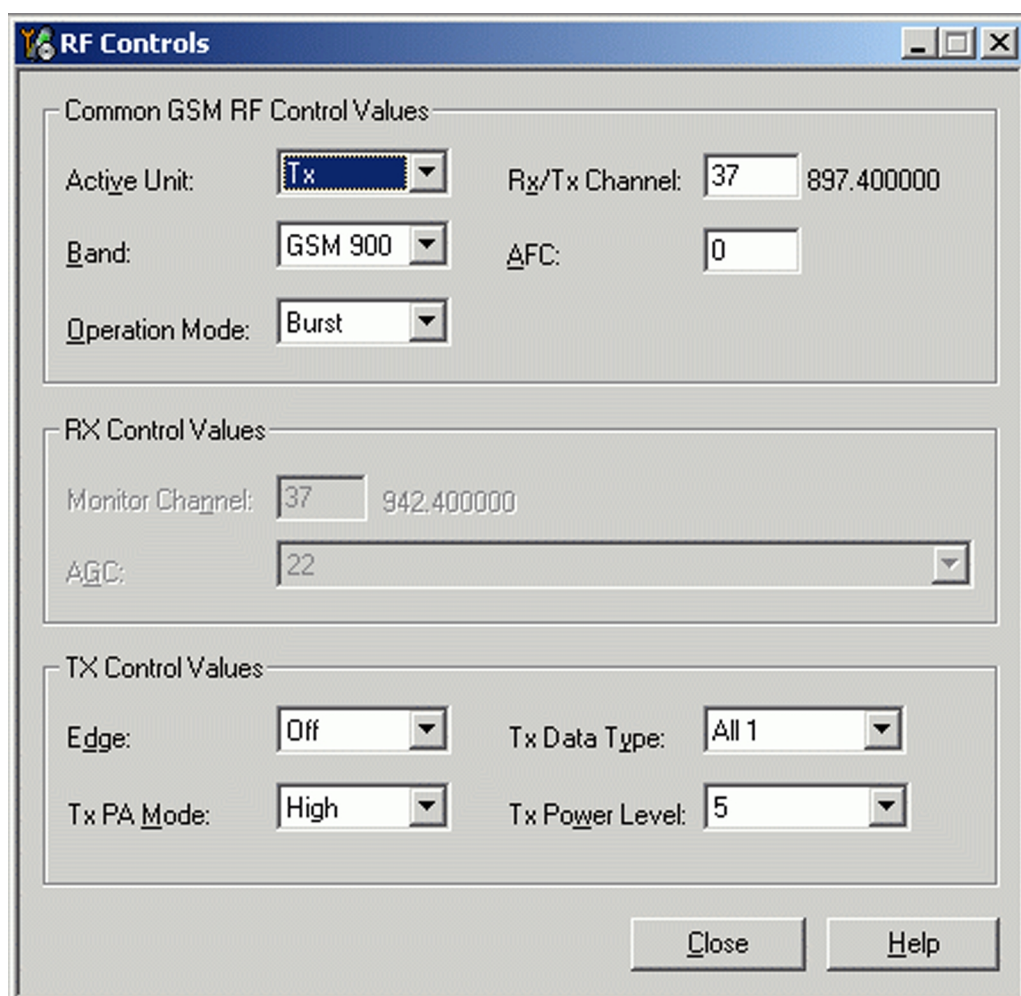
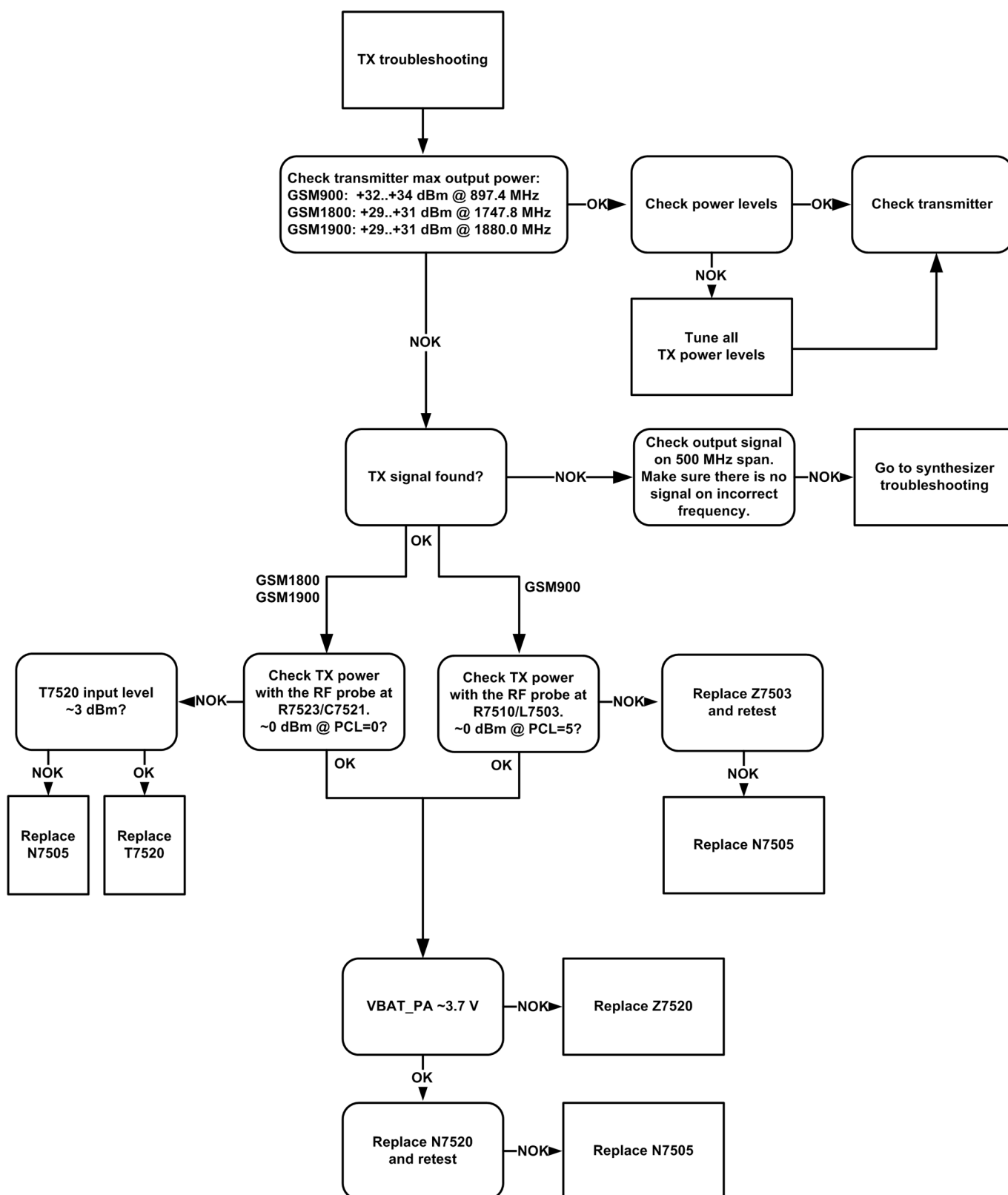


Figure 45 RF Controls window

## Transceiver (TX) troubleshooting

### Troubleshooting flow



## Checking antenna functionality

### GSM antenna

In the GSM antenna, there is one feed and two GND contacts.

Between GND1 and Feed, a DC short-circuit can be measured.

GND2 has no DC connection to the other contacts.

The antenna is functioning normally, if the contact pads hit the antenna C-clips on the PWB and the antenna is visually intact.

### BT antenna

The BT antenna is (as the GSM antenna) placed on the flex foil on the antenna module. It has one feed and one short contact. The antenna is functioning normally, if the contact pads hit the antenna C-clips on the PWB and the antenna is visually intact.

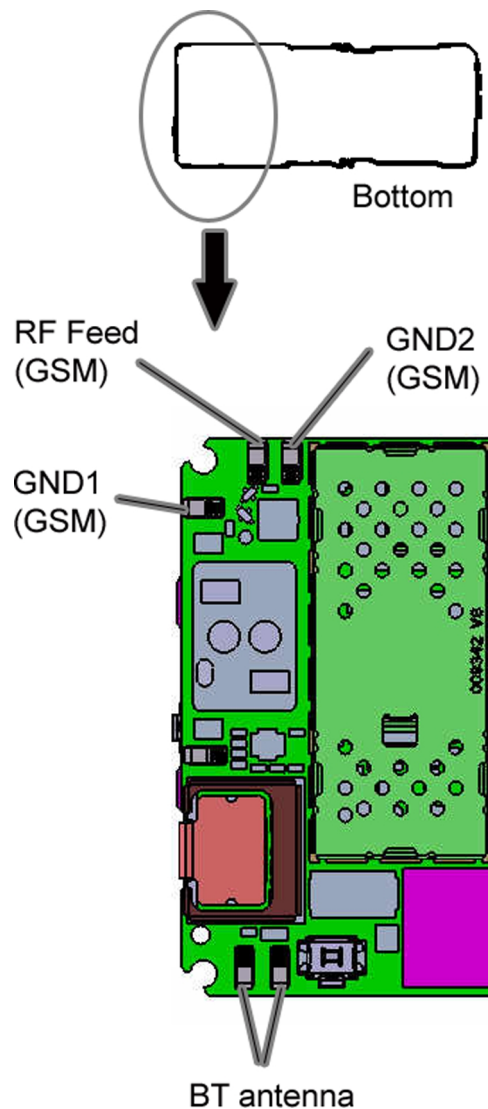


Figure 46 Location of the GSM and BT antenna C-clips on the PWB

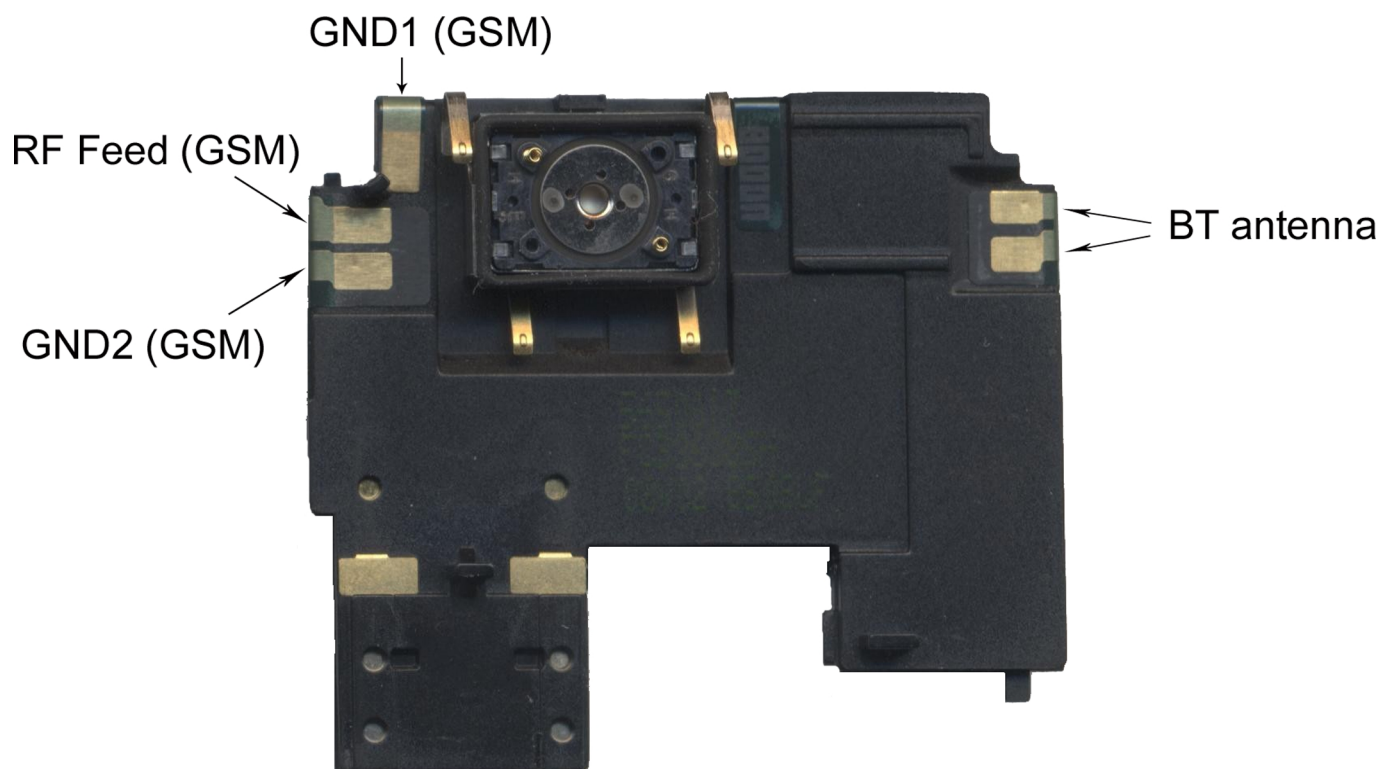


Figure 47 GSM and BT antenna contact pads on the antenna module

### Antenna C-clips

When checking the antenna functionality, you can also check that the antenna C-clips are intact (that is, there are no cracks/bends in them).

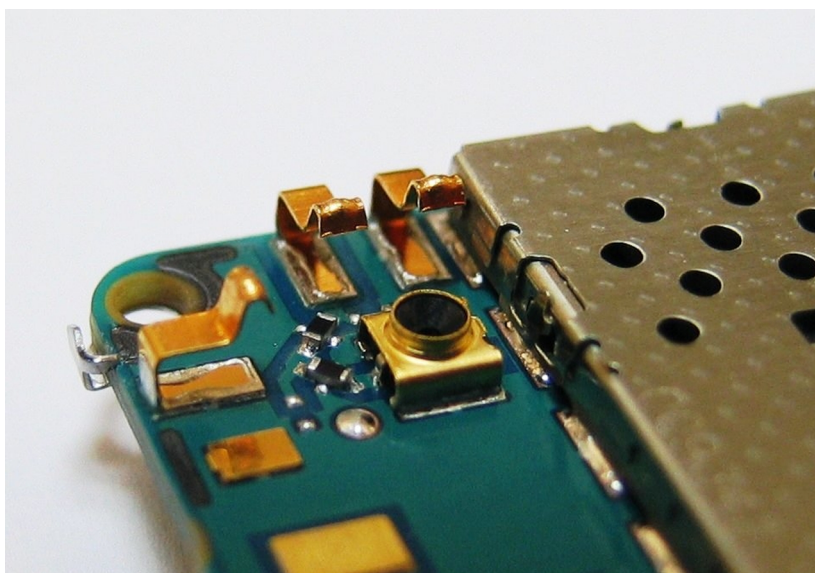
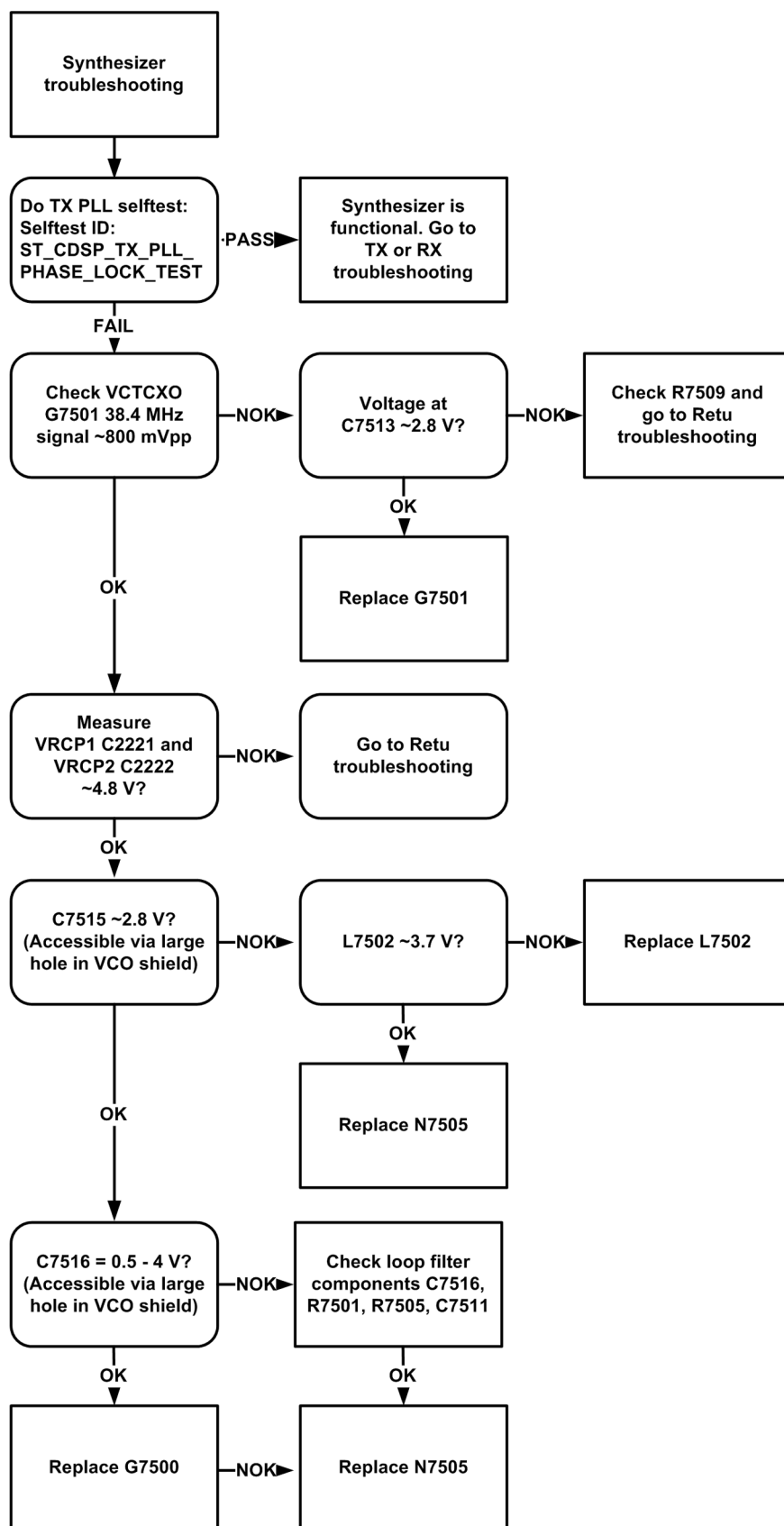


Figure 48 Antenna C-clips on the PWB

## ■ Synthesizer troubleshooting

### Synthesizer troubleshooting



## ■ RF tunings

### Introduction to RF tunings

**Important:** Only perform RF tunings if:

- one or more of the RF components have been replaced
- flash memory chip is replaced or corrupted.

RF calibration is always performed with the help of a product-specific module jig (MJ-122), never with an RF coupler. Using an RF coupler in the calibration phase will cause a complete mistuning of the RF part.

**Important:** After RF component replacements, **always** use autotuning. Manual tunings are only required in rare cases.

### Cable and adapter losses

RF cables and adapters have some losses. They have to be taken into account when the phone is tuned. As all RF losses are frequency dependent, the user has to act very carefully and understand the measurement setup.

For RF attenuations of the module jig, please refer to the Service tools section.

### Auto tuning for BB5.0

This phone can be tuned automatically.

Autotune is designed to align the phone's RF part easier and faster. It performs calibrations, tunings and measurements of RX and TX. The results are displayed and logged in a result file, if initiated.

### Hardware set up

Hardware requirements for auto tuning:

- PC (Windows 2000/XP) with GPIB card
- Power supply
- Product specific module jig
- Cables: XRF-1 (RF cable), USB cable, GBIP cable and DAU-9S
- Signal analyser (TX), signal generator (RX) and RF-splitter *or* one device including all.

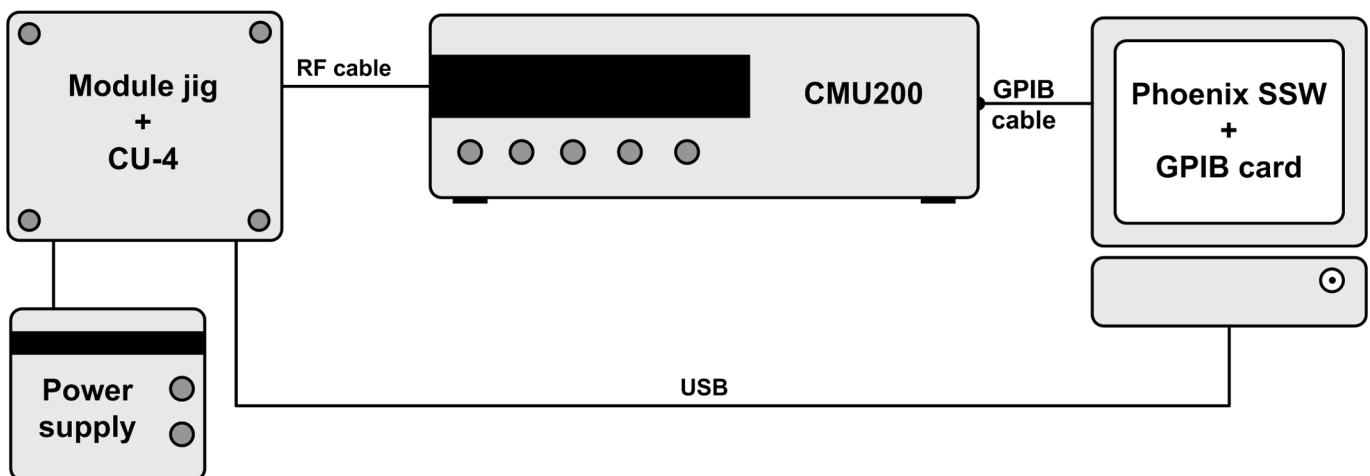


Figure 49 Auto tuning concept with CMU200

## Phoenix preparations

Install the phone specific data package, for example *RM-237\_DP20\_4.351\_sw-sk4.35[1].exe*. This defines phone specific settings..

## Auto tuning procedure

- 1 Make sure the phone (in the jig) is connected to the equipment. Else, some menus will not be shown in Phoenix.
- 2 To go to autotune, select *Tuning (Alt-U) > Auto-Tune (Alt-A)* from the menu.
- 3 Start autotuning, clicking the *Tune* button.

## ■ System mode independent manual tunings

### RF channel filter calibration

#### Context

Rf channel filter calibration tunes the internal low pass filters of the RF ASIC, that limit the bandwidth of BB IQ signals.

Table 12 Rf channel filter calibration tuning limits

	Min	Typ	Max
Tx filter	0	10	31
RX mixer	0	13	31
Rx filter	0	16	31

#### Steps

1. From the **Operating mode** drop-down menu, set mode to **Local**.
2. Choose **Tuning**→**Rf Channel Filter Calibration** .
3. Click **Tune**.
4. To save the values to the PMM (Phone Permanent Memory) area, click **Write**.
5. To close the *Rf Channel Filter Calibration* window, click **Close**.

#### Results

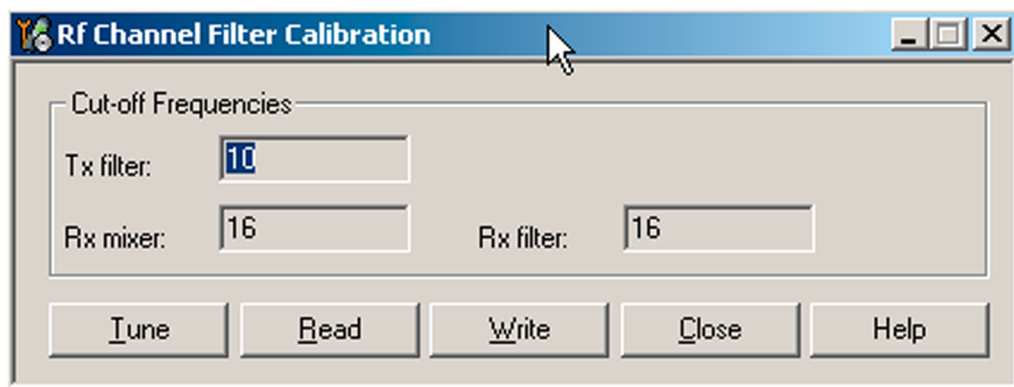


Figure 50 Rf channel filter calibration typical values



## PA (power amplifier) detection

### Context

The PA detection procedure detects which PA manufacturer is used for phone PAs.

If a PA is changed or if the permanent memory (PMM) data is corrupted, PA detection has to be performed before Tx tunings.

### Steps

1. From the **Operating mode** drop-down menu, set mode to **Local**.
2. Choose **Tuning**→**PA Detection**.
3. Click **Tune**.
4. Check that the detected PA manufacturers are corresponding to the actual chips on the board.
5. To end the procedure, click **Close**.

## ■ GSM receiver tunings

### Rx calibration (GSM)

### Context

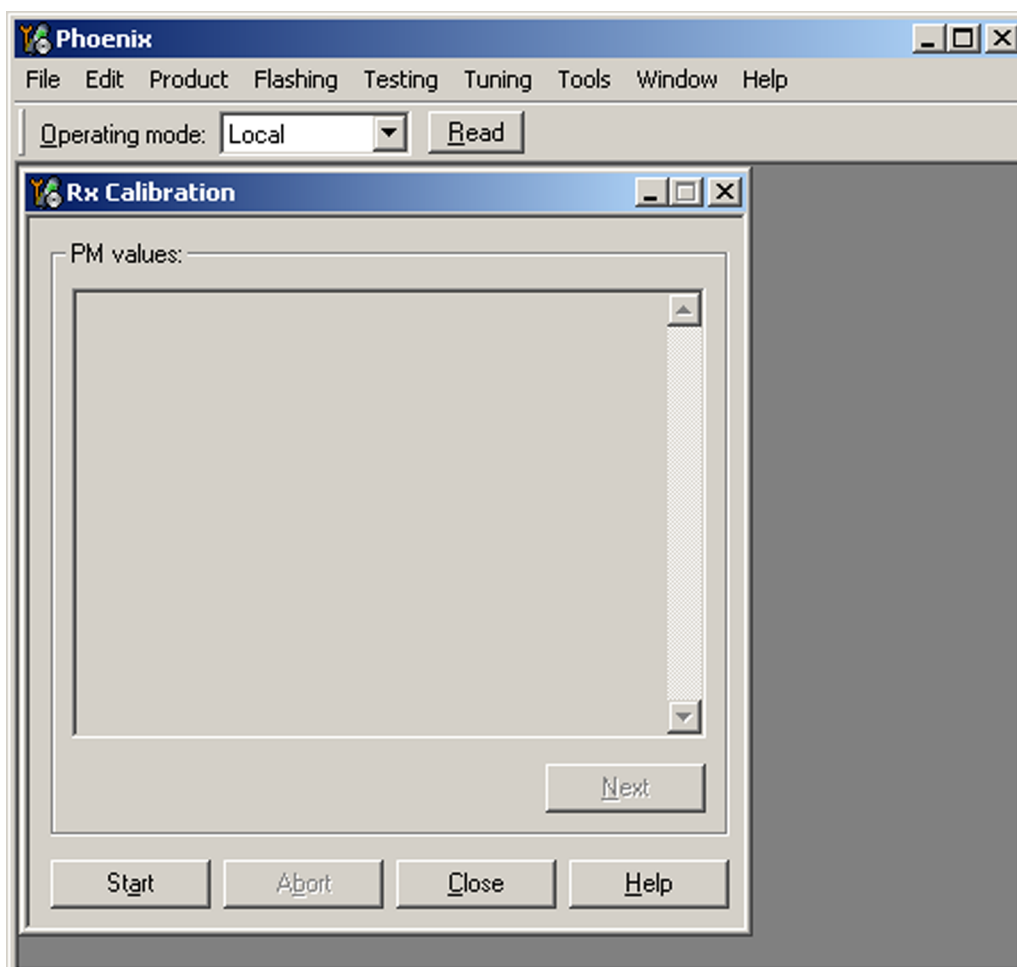
Rx Calibration is used to find out the real gain values of the GSM Rx AGC system and tuning response of the AFC system (AFC D/A init value and AFC slope)

### Steps

1. Connect the GSM connector of the module jig to a signal generator.
2. Start *Phoenix* service software.
3. From the **Operating mode** drop-down menu, set mode to **Local**.
4. Choose **Tuning**→**GSM**→**Rx Calibration**.

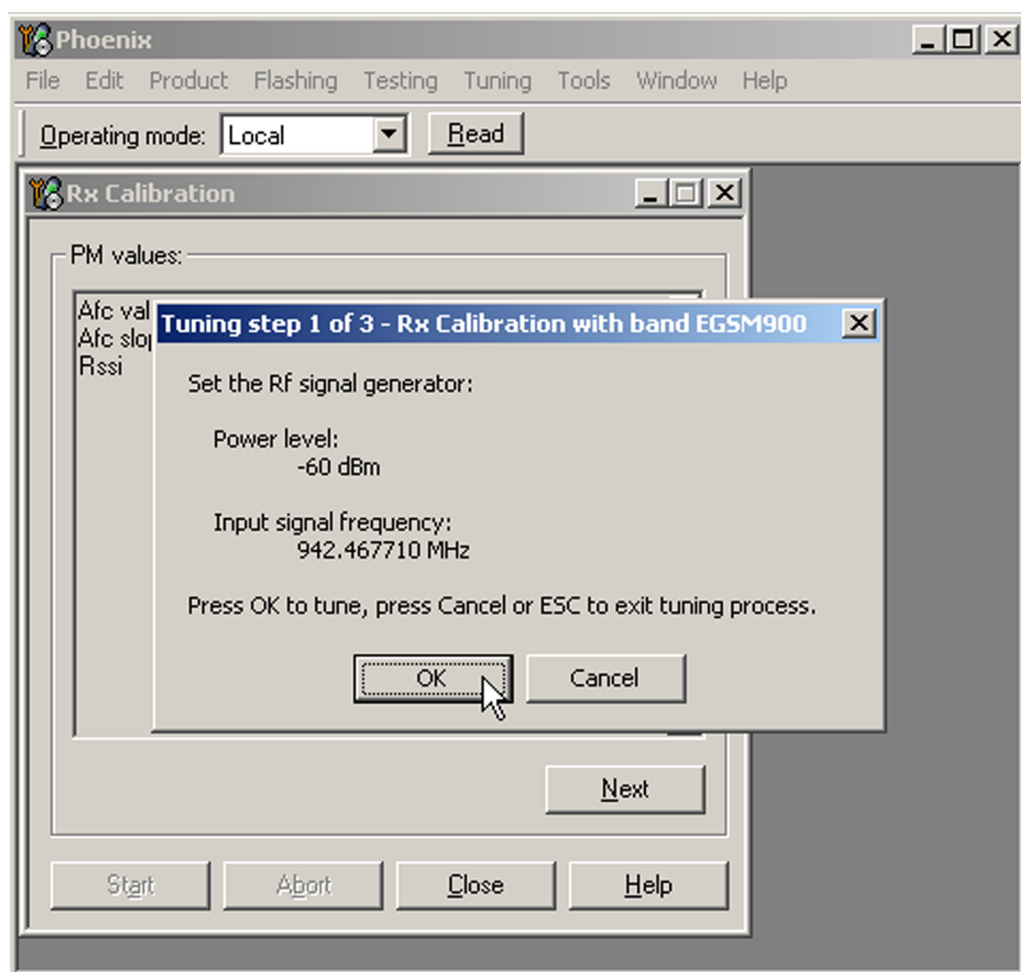


5. Click **Start**.



6. Connect the signal generator to the phone, and set frequency and amplitude as instructed in the **Rx Calibration with band EGSM900** (step 1-3) pop-up window.

**Important:** The calibration uses a non-modulated CW signal. Increase the signal generator level by cable attenuation and module jig probe attenuation.

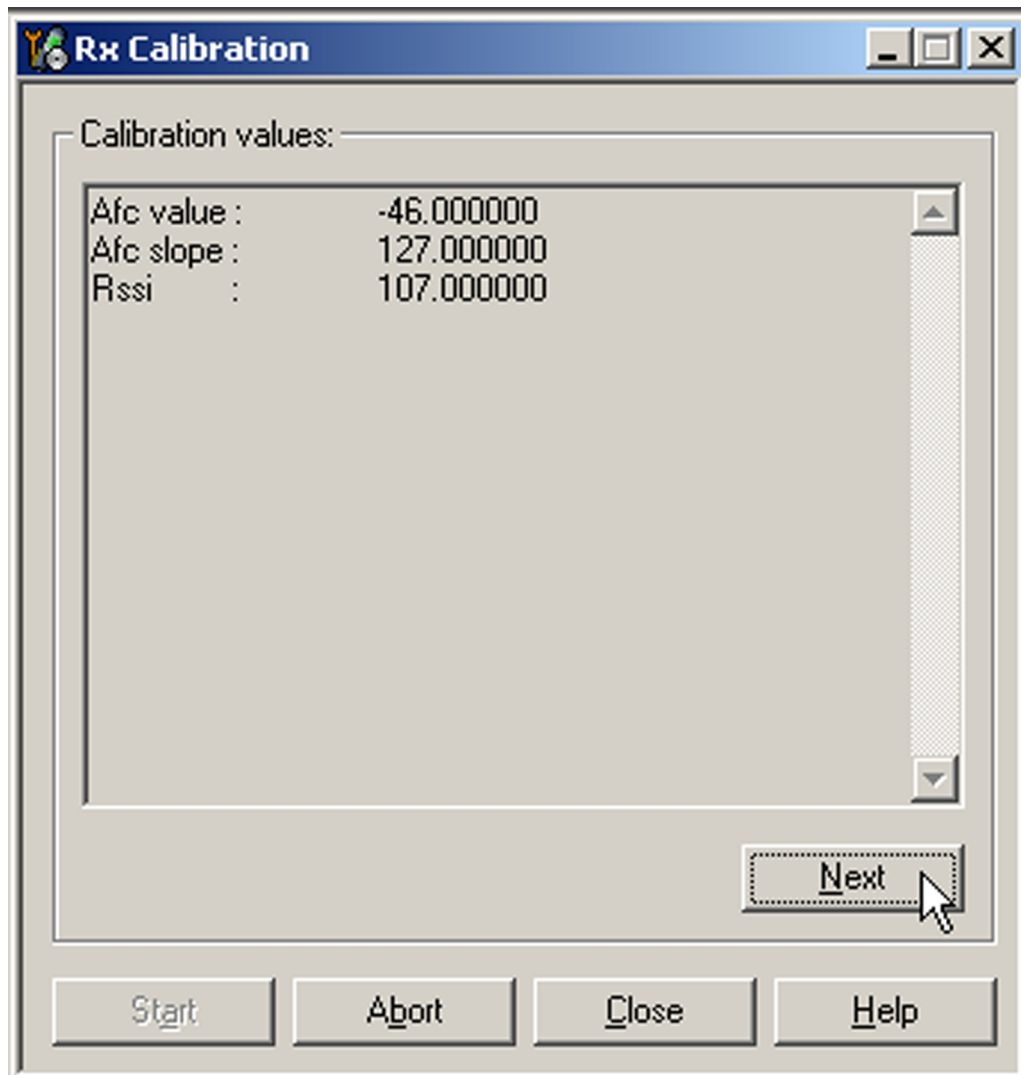


7. To perform the tuning, click **OK**.
8. Check that the tuning values are within the limits specified in the following table:

**Table 13 RF tuning limits in Rx calibration**

	Min	Typ	Max	Unit
<b>GSM900</b>				
AFC Value (init)	-200	-105..62	200	-
AFC slope	0	122	200	-
RSSI (AGC-0)	106	107...110	114	dB
<b>GSM1800</b>				
RSSI (AGC-0)	105	105...109	114	dB
<b>GSM1900</b>				
RSSI (AGC-0)	105	105...109	114	dB

9. Click **Next** to continue with GSM1800 Rx tuning.



### Next actions

Repeat steps 6 to 9 for GSM1800 and GSM1900

### Rx band filter response compensation (GSM)

#### Prerequisites

Rx calibration must be performed before the Rx band filter response compensation.

#### Context

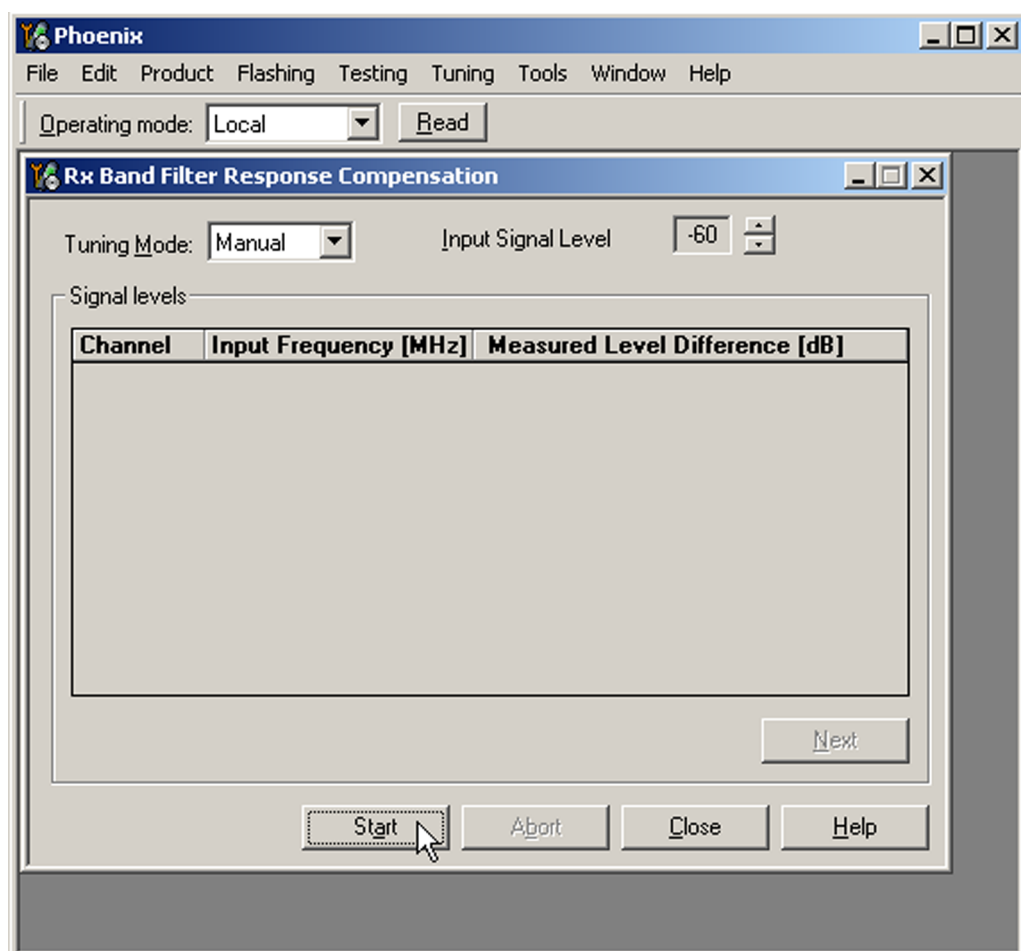
On each GSM Rx band, there is a band filter in front of the RF ASIC front end. The amplitude ripple caused by these filters causes ripple to the RSSI measurement, and therefore calibration is needed.

The calibration has to be repeated for each GSM band.

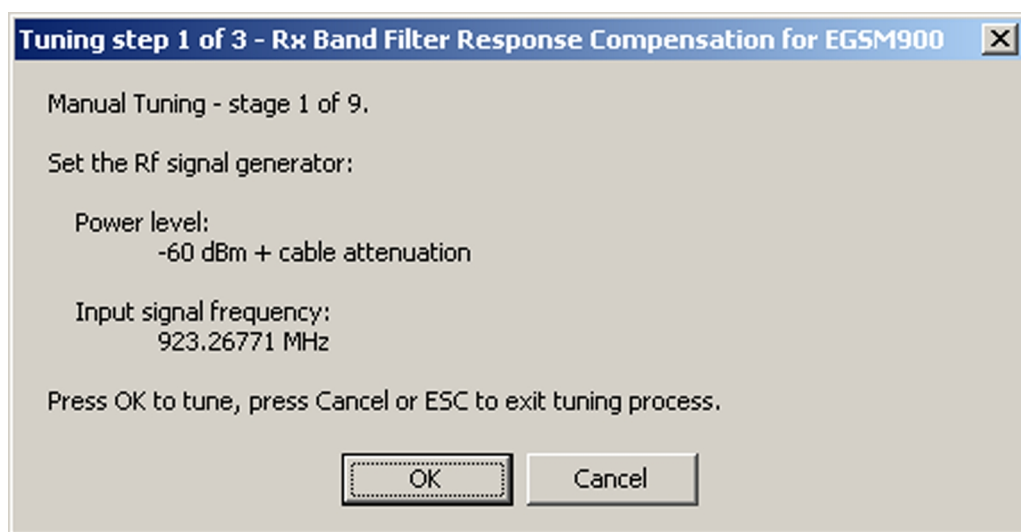
#### Steps

1. Connect the GSM connector of the module jig to a signal generator.
2. Start *Phoenix* service software.
3. From the **Operating mode** drop-down menu, set mode to **Local**.

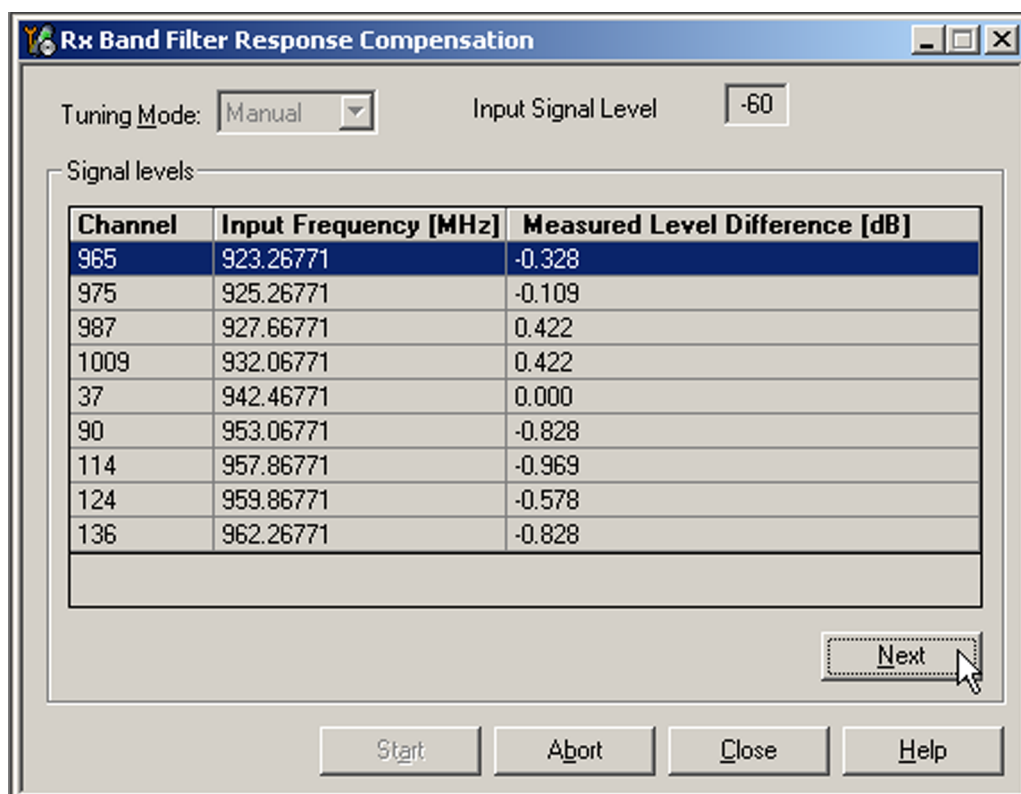
4. Select **GSM900** band.
5. Choose **Tuning**→**GSM**→**Rx Band Filter Response Compensation**.
6. Select **Tuning mode: manual**
7. Click **Start**.



8. Connect the signal generator to the phone, and set frequency and amplitude as instructed in the *Rx Band Filter Response Compensation for EGSM900* pop-up window, step 1-3.



9. To perform tuning, click **OK**.
10. Go through all 9 frequencies. The following table will be shown:



11. Check that the tuning values are within the limits specified in the following table:

	Min	Typ	Max	Unit
<b>GSM900</b>				
Ch. 965 / 923.26771 MHz	-6	-1	2	dB
Ch. 975 / 925.26771 MHz	-3	0	2	dB
Ch. 987 / 927.66771 MHz	-3	0	2	dB
Ch. 1009 / 932.06771 MHz	-2	0	2	dB
Ch. 37 / 942.46771 MHz	-2	0	2	dB
Ch. 90 / 953.06771 MHz	-2	0	2	dB
Ch. 114 / 957.86771 MHz	-3	0	2	dB
Ch. 124 / 959.86771 MHz	-3	0	2	dB
Ch. 136 / 962.26771 MHz	-6	-1	2	dB
<b>GSM1800</b>				
Ch. 497 / 1802.26771 MHz	-6	-1	3	dB
Ch. 512 / 1805.26771 MHz	-3	0	3	dB
Ch. 535 / 1809.86771 MHz	-3	0	3	dB
Ch. 606 / 1824.06771 MHz	-3	0	3	dB

	Min	Typ	Max	Unit
Ch. 700 / 1842.86771 MHz	-3	0	3	dB
Ch. 791 / 1861.06771 MHz	-3	0	3	dB
Ch. 870 / 1876.86771 MHz	-3	0	3	dB
Ch. 885 / 1879.86771 MHz	-3	0	3	dB
Ch. 908 / 1884.46771 MHz	-6	-1	3	dB
<b>GSM1900</b>				
Ch. 496 / 1927.06771 MHz	-6	-1	2	dB
Ch. 512 / 1930.26771 MHz	-3	0	2	dB
Ch. 537 / 1935.26771 MHz	-3	0	2	dB
Ch. 586 / 1945.06771 MHz	-3	0	2	dB
Ch. 661 / 1960.06771 MHz	-3	0	2	dB
Ch. 736 / 1975.06771 MHz	-3	0	2	dB
Ch. 794 / 1986.66771 MHz	-3	0	2	dB
Ch. 810 / 1989.86771 MHz	-3	0	2	dB
Ch. 835 / 1994.86771 MHz	-6	-1	2	dB

12. If the values are within the limits, click **Next** to continue to the next band.

## Next actions

Repeat the steps 8 to 12 for GSM1800 and GSM1900.

## ■ GSM transmitter tunings

### Tx IQ tuning (GSM)

#### Context

The Tx path branches to I and Q signals at RF I/Q modulator. Modulator and analog hardware located after it cause unequal amplitude and phase disturbance to I and Q signal paths. Tx IQ tuning balances the I and Q branches.

Tx IQ tuning must be performed for all GSM bands.

#### Steps

1. Start *Phoenix* service software.
2. From the **Operating mode** drop-down menu, set mode to **Local**.
3. Choose **Tuning**→**GSM**→**Tx IQ Tuning**.

4. Select **Mode: Automatic**.

**Tx IQ Selftuning**

Settings

Channel:  Power Level:

Tuning Values

Band	Dc Offset I	Dc Offset Q	Amplitude	Phase
GSM850/Edge	-0.144	-0.576	-0.1	89.00
GSM900/Edge	-0.144	-0.592	-0.1	89.00
GSM1800/Ed...	0.792	-0.180	0.1	94.00
GSM1900/Ed...	0.900	-0.160	0.1	93.00

5. Select band **GSM900** and click **Start**.
6. Click **Next** to start GSM1800 band TX IQ tuning.
7. Click **Next** to start GSM1900 band TX IQ tuning.
8. Click **Finish** and then **Close**.

## Next actions

Tuning sliders should be close to the center of the scale after the tuning and within the limits specified in the following table. If they are not within the limits, check Tx IQ quality manually.

	Min	Typ	Max	Unit
<b>GSM900</b>				
I DC offset / Q DC offset	-6	-4	6	%
Ampl	-1	0	1	dB
Phase	85	90	95	°
<b>GSM1800/GSM1900</b>				
I/Q DC	-6	0.5	6	%
Ampl	-1	0	1	dB
Phase	95	100	110	°

## Tx power level tuning (GSM)

### Context

Because of variations at the IC (Integrated Circuit) process and discrete component values, the actual transmitter RF gain of each phone is different. Tx power level tuning is used to find out mapping factors called 'power coefficients'. These adjust the GSM transmitter output power to fulfill the specifications.

For EDGE transmission, the bias settings of the GSM PA are adjusted in order to improve linearity. This affects the PA gain and hence the power levels have to be aligned separately for EDGE transmission.

Tx power level tuning has to be performed on all GSM bands.

### Steps

1. Connect the phone to a spectrum analyzer.
2. Start *Phoenix* service software.
3. From the **Operating mode** drop-down menu, set mode to **Local**.
4. Choose **Tuning**→**GSM**→**Tx Power Level Tuning**.



5. Click **Start**.

**Tx Power Level Tuning**

Settings

Band: **GSM 900** Freq. [MHz]: **897.40**

Power Levels

Power Level	Value	Target	DAC
14 Coeff.	0.2830	15.0	290
15 Coeff.	0.2656	13.0	272
<b>16 Coeff.</b>	<b>0.2516</b>	<b>11.0</b>	<b>258</b>
17 Coeff.	0.2386	9.0	244
18 Coeff.	0.2280	7.0	233
<b>19 Coeff.</b>	<b>0.2166</b>	<b>5.0</b>	<b>222</b>
Base Coeff.	0.0869		89
2SlotThreshold	7.0000		7168
2SlotCoefficient	0.5596	30.5	573
3SlotThreshold	7.0000		7168
3SlotCoefficient	0.5596	30.5	573
4SlotThreshold	7.0000		7168
4SlotCoefficient	0.5596	30.5	573

Read Next

Start Finish Close Help

6. Set the spectrum analyzer for power level tuning:

Frequency	Channel frequency: <ul style="list-style-type: none"> <li>• <b>897.4MHz GSM900</b></li> <li>• <b>1747.8MHz GSM1800</b></li> <li>• <b>1880MHz GSM1900</b></li> </ul>
Span	0 Hz
Sweep time	2ms
Trigger	Video triggering (-10dBm)
Resolution BW	3MHz

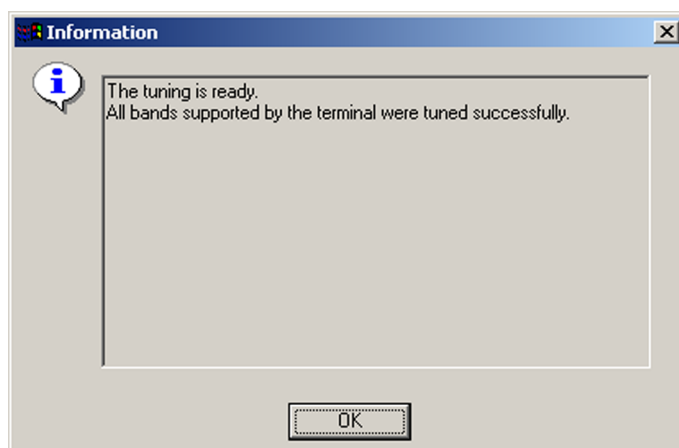
Video BW	3MHz
Reference level offset	sum cable attenuation with module jig attenuation
Reference level	33dBm

A power meter with a peak power detector can be also used. Remember to take the attenuations into account.

7. Adjust power for all bold power levels to correspond the **Target dBm** column by pressing + or – keys.
8. If all bold power levels are adjusted, click **Next** to continue with **GSM900 EDGE**.
9. Adjust power for all bold power levels to correspond the **Target dBm** column by pressing + or – keys.

### Next actions

Continue tuning the bold power levels of the GSM1800 and GSM1900 bands. You will see this message, if finished successfully:



## 8 — System module

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## ■ Phone description

### Introduction

This chapter describes the system module including engine, power management, interfaces, audio etc. The baseband is based on BB5.0 with a RAPGSM main processor and Retu/Tahvo energy management. All blocks that require high voltage process are in Tahvo and all other in Retu. The RF part is based on the ASIC Ahne.

RM-237 is a monoblock phone, in which all electrical components are assembled into one PWB.

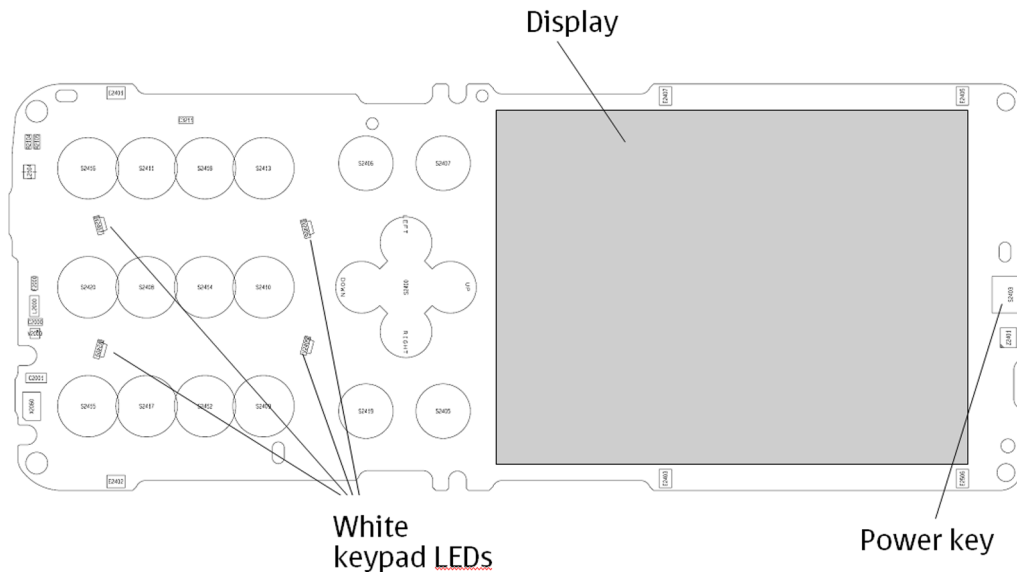
RM-237 operates on the GSM 900/1800/1900 bands.

### Key components

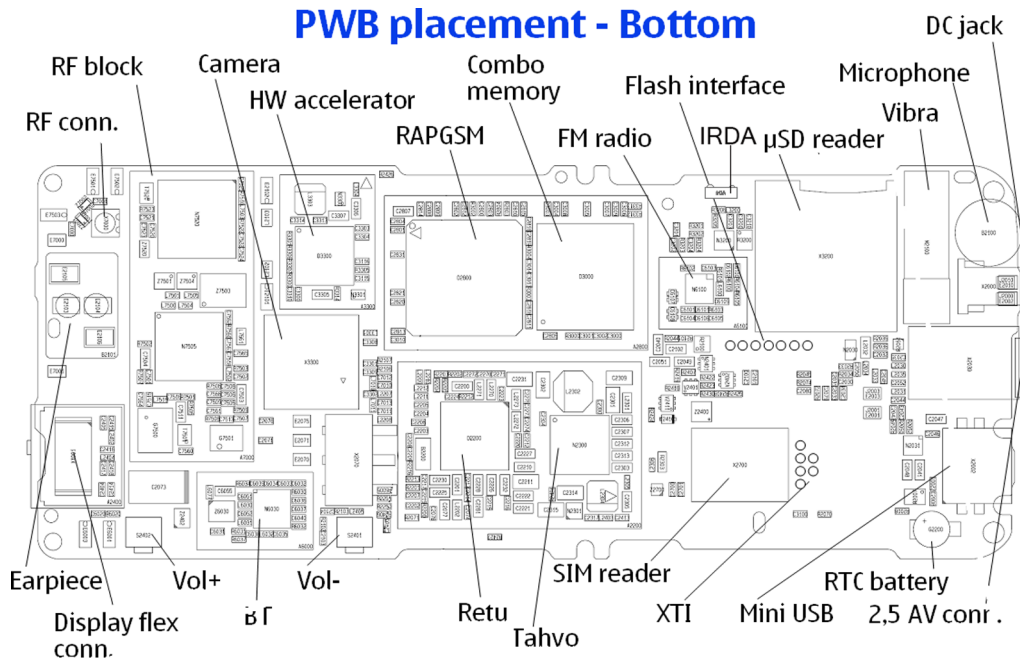
Function	Name	Item
Energy management	Retu	D2200
	Tahvo	N2300
Main processor	RAPGSM	D2800
Memory	Combo: 128 Mbit SDRAM & 256 Mbit NOR flash	D3000
RF ASIC	Ahne	N7505
Front end module	Power amplifier and Antenna Switch	N7520
Antenna	Antenna module assembly RM-237: 900/1800/1900MHz	
System connector	AV connector	X2030
	mini USB connector	X2002
Battery	BL-5C, 3.7 V, 860 mAh	
Bluetooth	BC4-ROM	N6030
FM radio	TEA5760	N6100
IHF Speaker	Donau or Aura (in antenna module assembly)	
Earpiece	RDF-07A 320HM 10.86x7.40.2.2	B2101
Microphone	Clapton	B2100
Vibra	SMD VIBRA MOTOR	M2100
Charger connector	2 mm Nokia charger interface	X2000
Camera	1.3Mpik Konica	
HWA	STV0984N	D3300
Display	SEID or AU0 128X160	
LED driver	TPS 61061 YZFR	N2301
RTC battery	311 size	G2200

## PWB overview

### PWB placement - Top



### PWB placement - Bottom





## System block diagram

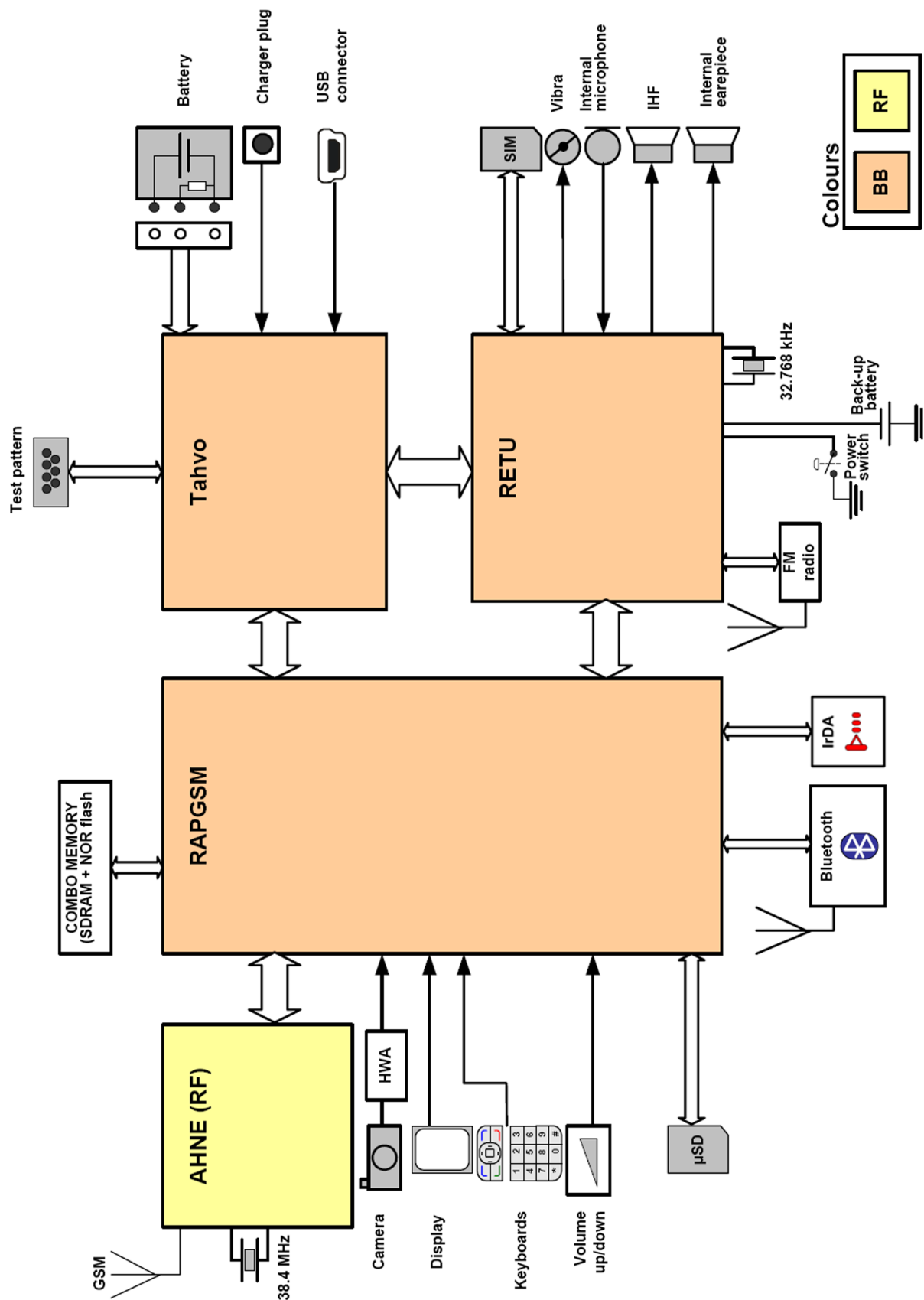


Figure 51 System block diagram

## Board and module connections

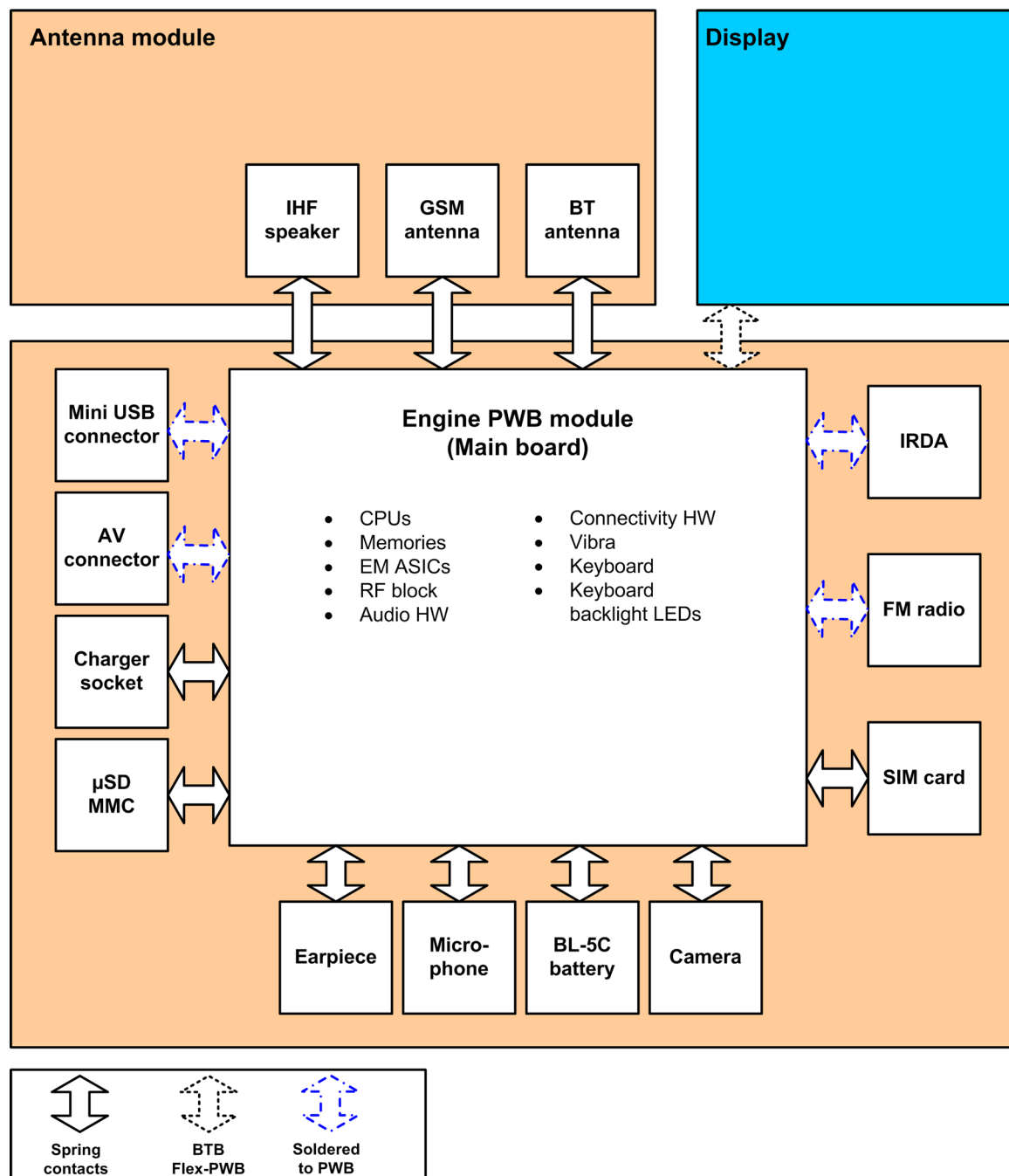


Figure 52 Board and module connections

## ■ Engine

### Engine modules

The engine contains

- RF module with Ahne ASIC
- Main processor with integrated memory (Baseband)
- Energy management - Retu and Tahvo (Baseband)

- SDRAM and NOR flash memories

## RF engine

The RF module performs the high frequency operations of the engine for GSM. In both transmitter and receiver, the modulator and demodulator operate at the channel frequency.

The core components of the RF module are:

- Ahne RF ASIC (application specific integrated circuit)
- Front end module (FEM) module (Power amplifier and Antenna switch)

The RF engine also includes:

- Voltage controlled oscillators (VCO and VCTCX0)
- SAW filters

The baseband section controls the RF module through the serial bus, RFBUS. This passes information about eg. frequency band and mode of operation. Ahne RF ASIC controls the mode of operation, and further sends control signals to the front end module.

In addition to the RFBUS there are other interface signals for the power control loop, VCTCX0 control and for the modulated waveforms.

## Main processor

The main processor in this device is RAPGSM, a BB5.0 ASIC.

Some of its interfaces, processors and controllers are:

- General purpose UARTs
- Processor modules
- I2C (between ICs) interface
- GSM coder
- Interfaces to user interface, SIM and MMC
- Accessory interface
- Handling of RF-BB interface
- I/O voltage = 1.8 V, Core voltage <1.8 V

## Energy management

Two ASICs manage the energy in the phone; Retu and Tahvo. Together they cover the analogue audio and energy management function needs.

### Tahvo

All blocks that need a special silicon process are included in Tahvo.

Tahvo's main features are:

- Energy management control
- Supply voltage generation
- Charge control
- Digital core supply
- Current control for LED supply

### Retu

The blocks that do not have special needs are included in Retu.

Retu controls for example:

- Audio block
- SIM
- FM radio

## Modes of operation

The functional behavior can be divided into seven different states. Each of these states will affect the general functionality of the phone:

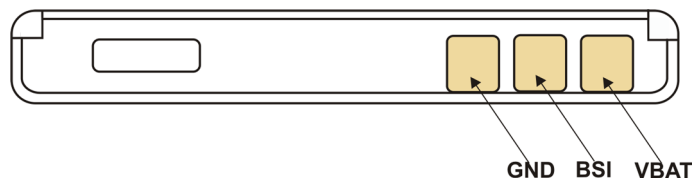
- No supply
- Backup
- Power off
- Reset
- Power on
- Deep sleep

## ■ Battery and charging

### Battery

- Type: BL-5C, Li-Ion
- Capacity: 1020mAh
- BSI resistor nominal value: 75 k $\Omega$

Battery temperature is measured on the NTC on the main board.



### Battery connector

The battery connector has three poles:

- BSI (Battery size indicator)
- GND (Ground)
- VBAT (Battery voltage)

The BSI line is used to recognize the battery capacity by a battery internal pull down resistor.

### Charging

This phone is charged through the smaller Nokia standard interface (2.0 mm plug). The old standard charger (3.5 mm) can be used together with the CA-44 charger adapter.



Figure 53 Old (left) and new (right) charger plugs

Charging is controlled by energy management, and external components are needed to protect the baseband module against EMC, reverse polarity and transient frequency deviation.

## ■ Interfaces

### FM radio

This phone uses a single-chip electronically tuned FM stereo radio with low voltage application.

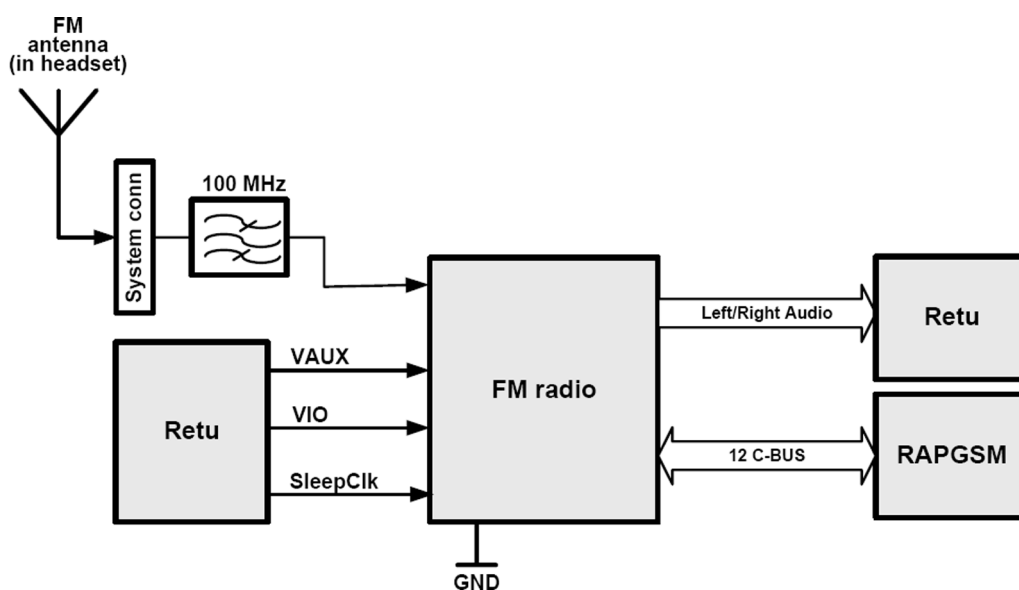
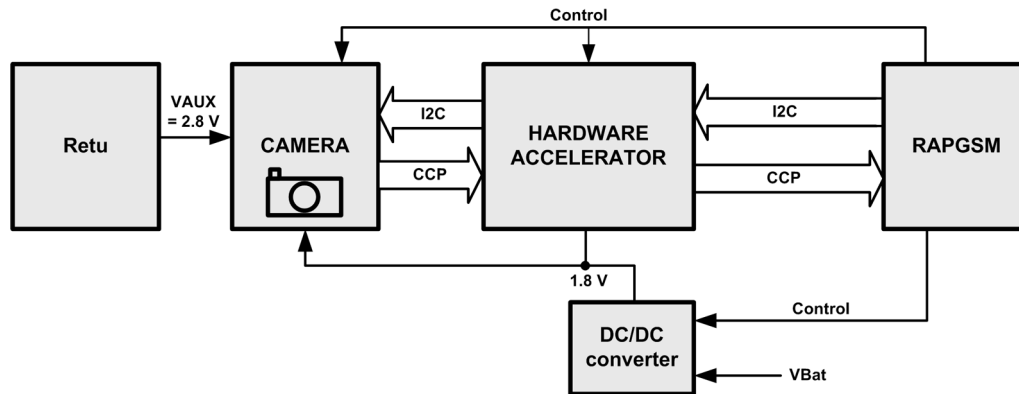


Figure 54 FM radio interface

### Camera

#### Camera interface

The RM-237 has a **1.3 Megapixel** camera, supported by a hardware accelerator.



## SIM

The SIM interface is the electrical interface between the SIM card and the mobile phone engine. The data communication between the SIM card and the phone is asynchronous half duplex.

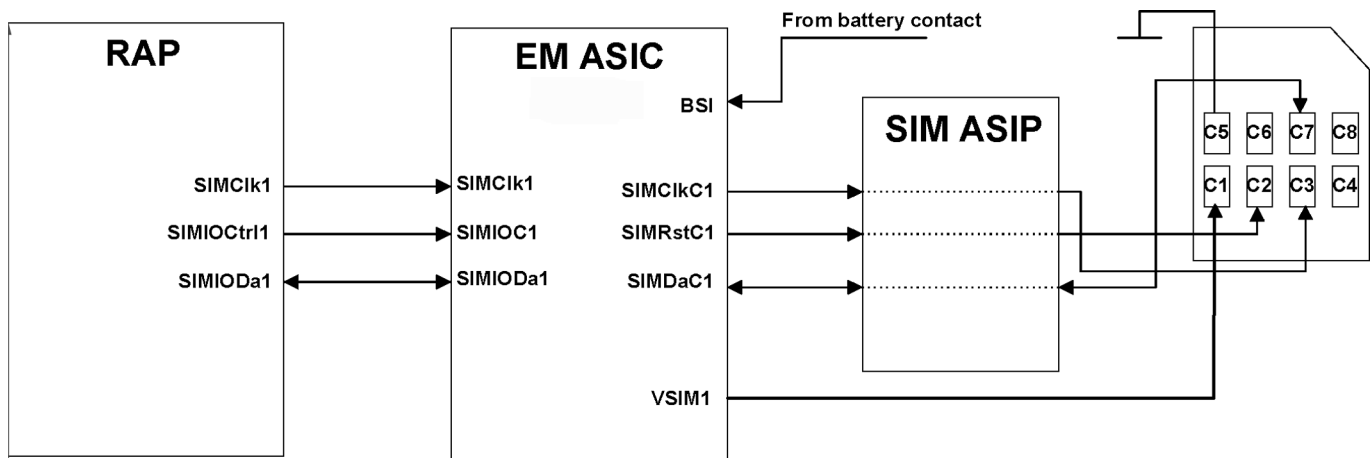


Figure 55 SIM interface connections

## SIM Logic level shifting

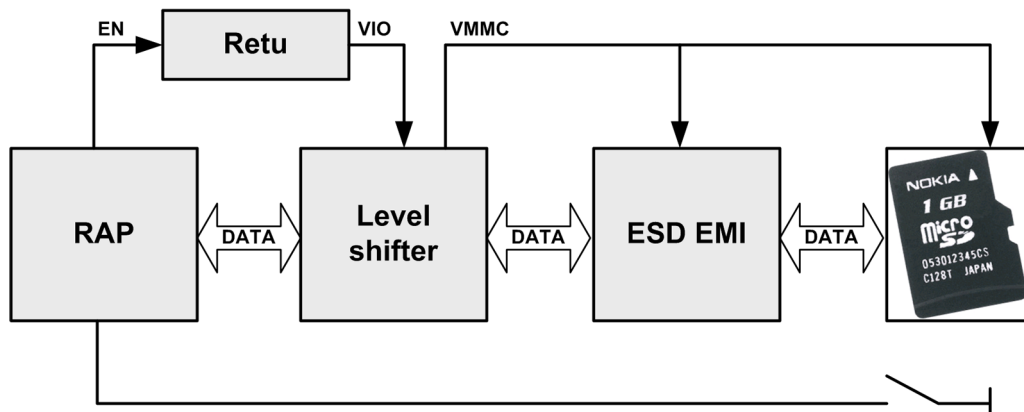
The SIM interface can support 3V and 1.8V SIM cards.

## SIM Power up/down

The SIM power up/down sequence is generated in Retu. This means that Retu generates the reset switch (RST) signal to the SIM. In addition, the SIMCardDet signal is connected to Retu.

The SIM interface is powered up when the SIMCardDet signal indicates "card in".

## µSD card interface



The µSD card is connected to the engine by an external level shifter and ESD protection filter. Supplied voltages:

- VMMC: 2.85 V (from level shifter)
- VIO: 1.8 V (from Retu)

The card removal is detected by a push detect switch.

## ■ User interface

### Display

The display unit comprises a parallel interface.

### Keyboard

All keys are placed on the main PWB.

- Numeric keys
- Navigation key, Soft keys, Start, and End
- Power switch
- Volume up and down switch

### Display and keypad backlight

There are two sets of LEDs illuminating the display and the keypads:

- Display LEDs, 4pcs
- Main keypad on PWB, 4 pcs, white colour

All sets share the same driver. None of the keypads can be illuminated without the LCD backlight being turned on.

## ■ Audio concept

### Audio concept

The functional core of the audio hardware is built around two ASICs; RAP engine and Retu.

Retu provides an interface for the transducers and the AV connector.

There are three audio transducers:

- 1 dynamic earpiece

- 1 dynamic speaker
- 1 microphone module

Retu also provides an output for the vibra motor.

All external audio accessories are connected to the specific audio connector.

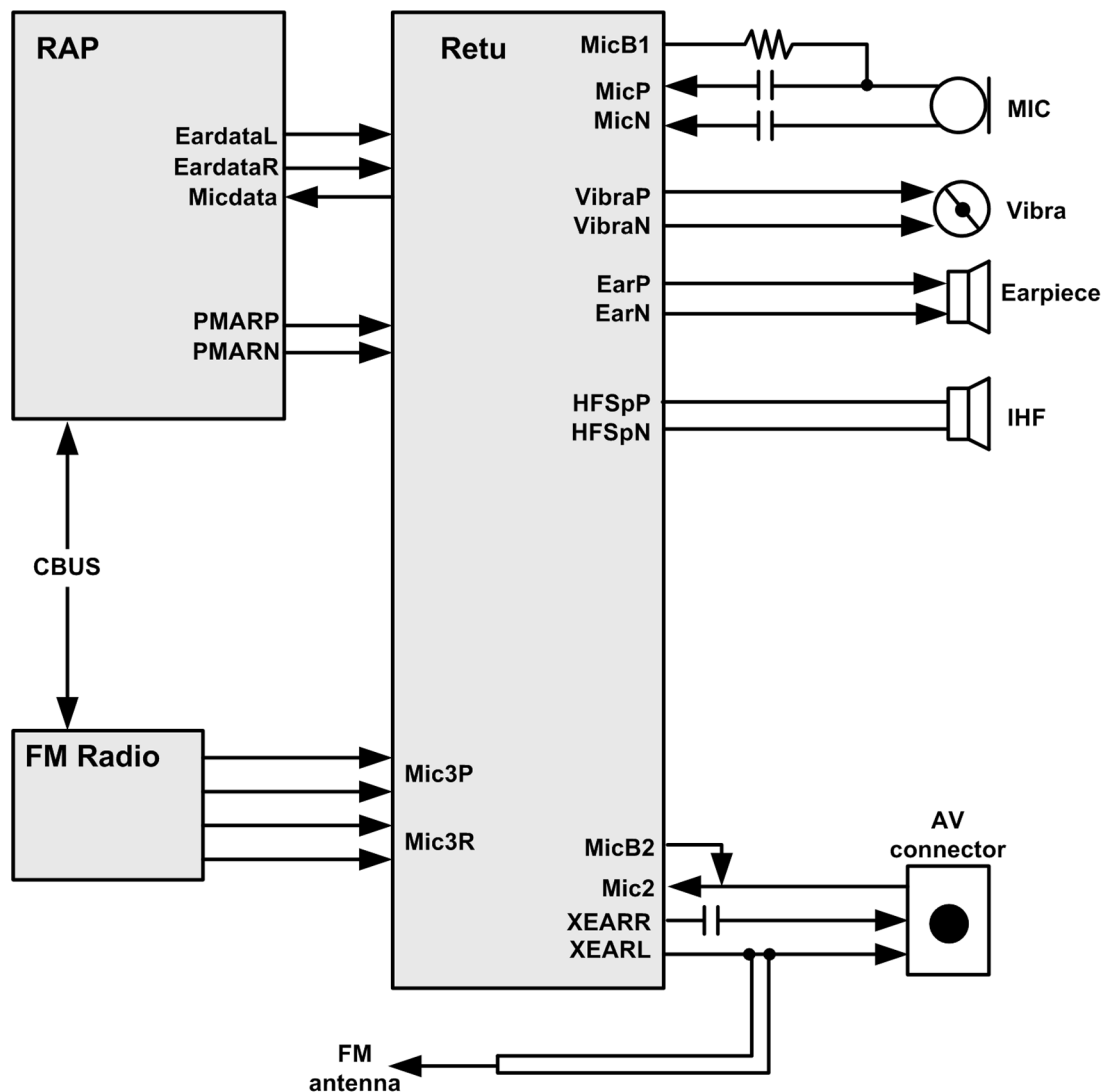


Figure 56 Audio block diagram

## Internal audio

The internal audio components are used in these modes:

	Hand portable (HP) mode	Internal hands free (IHF) mode
Microphone	X	X
Earpiece	X	
Speaker		X



## ■ Connections

### IrDA

IrDA is a fully digital peer-to-peer data link between IrDA units. The link is based on the serial transmission of data as pulses of infrared light. The IrDA module contains both RX part and TX part.

The IrDA interface is integrated in RAPGSM.

Datarate: 1.152 Mbit

Max. operating distance: 1 m

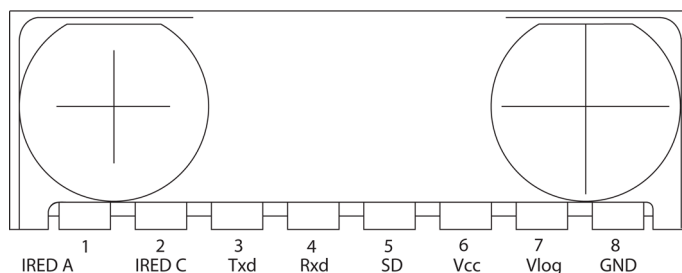


Figure 57 IR module pin ordering

### AV connector

Headsets and other galvanic accessories are connected to the specific audio input. The accessory mode is automatically enabled/disabled when a dedicated accessory is connected/disconnected.

**Note:** When testing external audio through the audio connector, make sure that the specific accessory can be used with this phone!

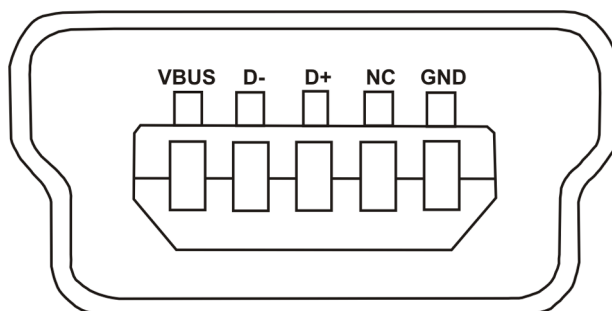
### USB

USB (Universal Serial Bus) provides a wired connectivity between a PC and peripheral devices. It is a differential serial bus.

USB 2.0 is supported with full speed (12 Mbps).

Hot swap is supported, which means that USB devices may be plugged in/out at any time.

This phone is provided with a specific connector for mini USB.



### Bluetooth

Bluetooth provides a fully digital link for communication between a master unit and one or more slave units. This bluetooth solution is a single chip solution.

Bluetooth connects to RAPGSM on the GENIO and GPIO busses.

The Bluetooth module is provided with power from VBat.

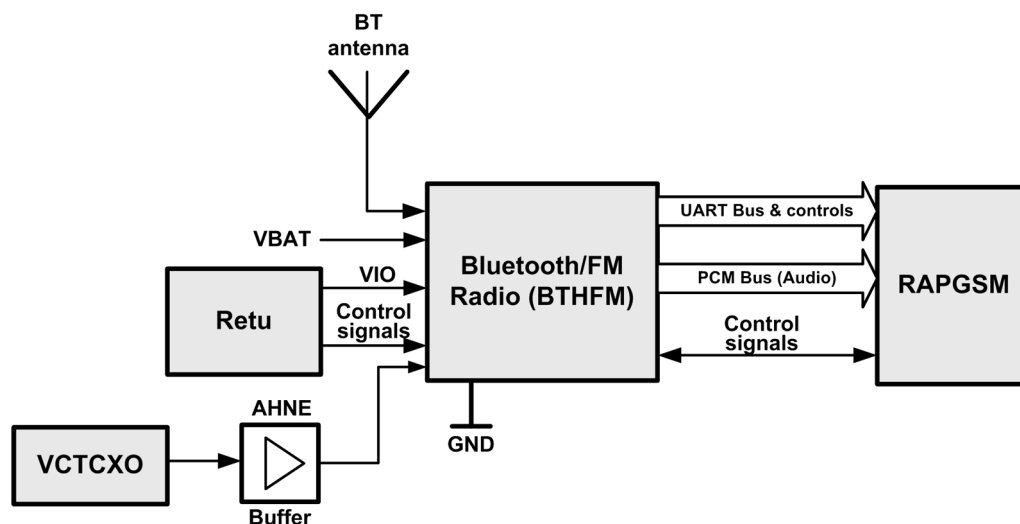


Figure 58 Bluetooth interface block diagram

## ■ Main RF characteristics

Table 14 Channel numbers and frequencies

System	Channel number	TX frequency	RX frequency	Unit
GSM900	$0 \leq n \leq 124$	$F = 890 + 0.2 \cdot n$	$F = 935 + 0.2 \cdot n$	MHz
	$975 \leq n \leq 1023$	$F = 890 + 0.2 \cdot (n - 1024)$	$F = 935 + 0.2 \cdot (n - 1024)$	MHz
GSM1800	$512 \leq n \leq 885$	$F = 1710.2 + 0.2 \cdot (n - 512)$	$F = 1805.2 + 0.2 \cdot (n - 512)$	MHz
GSM1900	$512 \leq n \leq 810$	$F = 1850.2 + 0.2 \cdot (n - 512)$	$F = 1930.2 + 0.2 \cdot (n - 512)$	MHz

Table 15 Main RF characteristics

Parameter	Unit and value
Cellular systems	EGSM900/GSM1800/GSM1900
RX Frequency range	EGSM900: 925 ... 960 MHz
	GSM1800: 1805...1880 MHz
	GSM1900: 1930...1990 MHz
TX Frequency range	EGSM900: 880 ... 915 MHz
	GSM1800: 1710 ...1785 MHz
	GSM1900: 1850...1910 MHz
Duplex spacing	EGSM900: 45 MHz
	GSM1800: 95 MHz
	GSM1900: 80 MHz
Channel spacing	200 kHz

Parameter	Unit and value
Number of RF channels	EGSM900: 174
	GSM1800: 374
	GSM1900: 300
Output Power	EGSM900: GSMK 5...32.5 dBm
	EGSM900: 8-PSK 5...26.5 dBm
	GSM1800: GSMK 0...30.5 dBm
	GSM1800: 8-PSK 0...25.5 dBm
	GSM1900: GSMK 0...30.5 dBm
	GSM1900: 8-PSK 0...25.5 dBm
Number of power levels GSMK	EGSM900: 15
	GSM1800: 16
	GSM1900: 16
Number of power levels 8-PSK	EGSM900: 12
	GSM1800: 14
	GSM1900: 14

**Table 16 Transmitter characteristics**

Item	Values
Type	Direct conversion, nonlinear, FDMA/TDMA
LO frequency range	EGSM900: 3520...3660 MHz (4 x TX freq)
	GSM1800: 3420...3570 MHz (2 x TX freq)
	GSM1900: 3700...3820 MHz (2 x TX freq)
Output power (EGSM900/GSM1800/GSM1900)	GMSK 33/33/30/30 dBm 8-PSK 32.5/30.5/30.5 dBm
Gain control range	min. 30 dB
Phase error (RMS/peak), GMSK	5 deg./20 deg. peak
EVM (RMS/peak), 8-PSK	10%/30%

**Table 17 Receiver characteristics**

Item	Values
Type	Direct conversion, Linear, FDMA/TDMA
LO frequencies	EGSM900: 3700...3840 MHz (4 x RX freq)
	GSM1800: 3610...3760 MHz (2 x RX freq)
	GSM1900: 3860...3980 MHz (2 x RX freq)
Typical 3 dB bandwidth	+/- 91 kHz

Item	Values
Sensitivity	min. - 102 dBm (normal condition)
Total typical receiver voltage gain (from antenna to RX ADC)	86 dB
Receiver output level (RF level -95 dBm)	40 mVpp, single-ended I/Q signals to RX ADCs

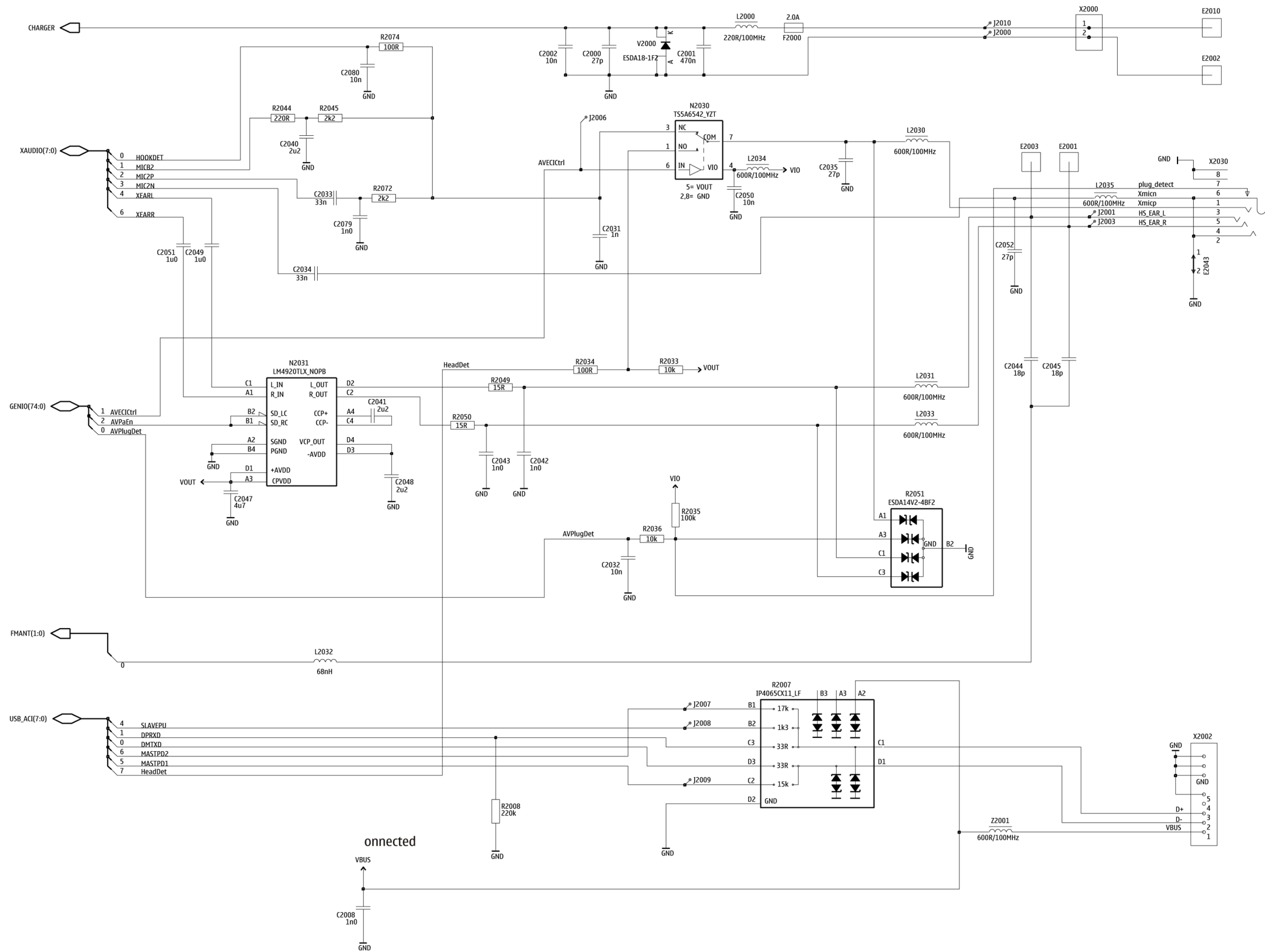
## 9 — Schematics

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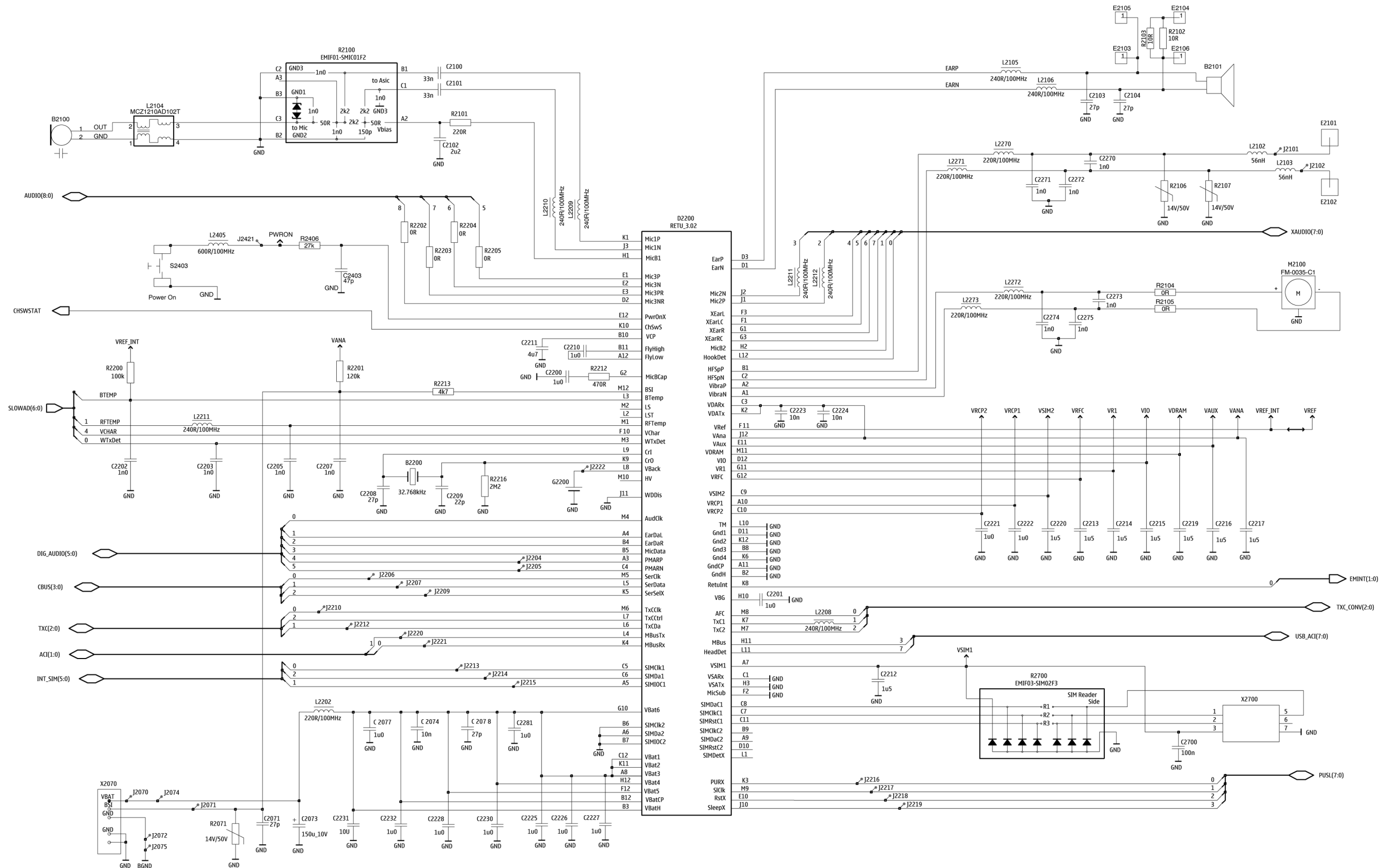
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■ System Connector

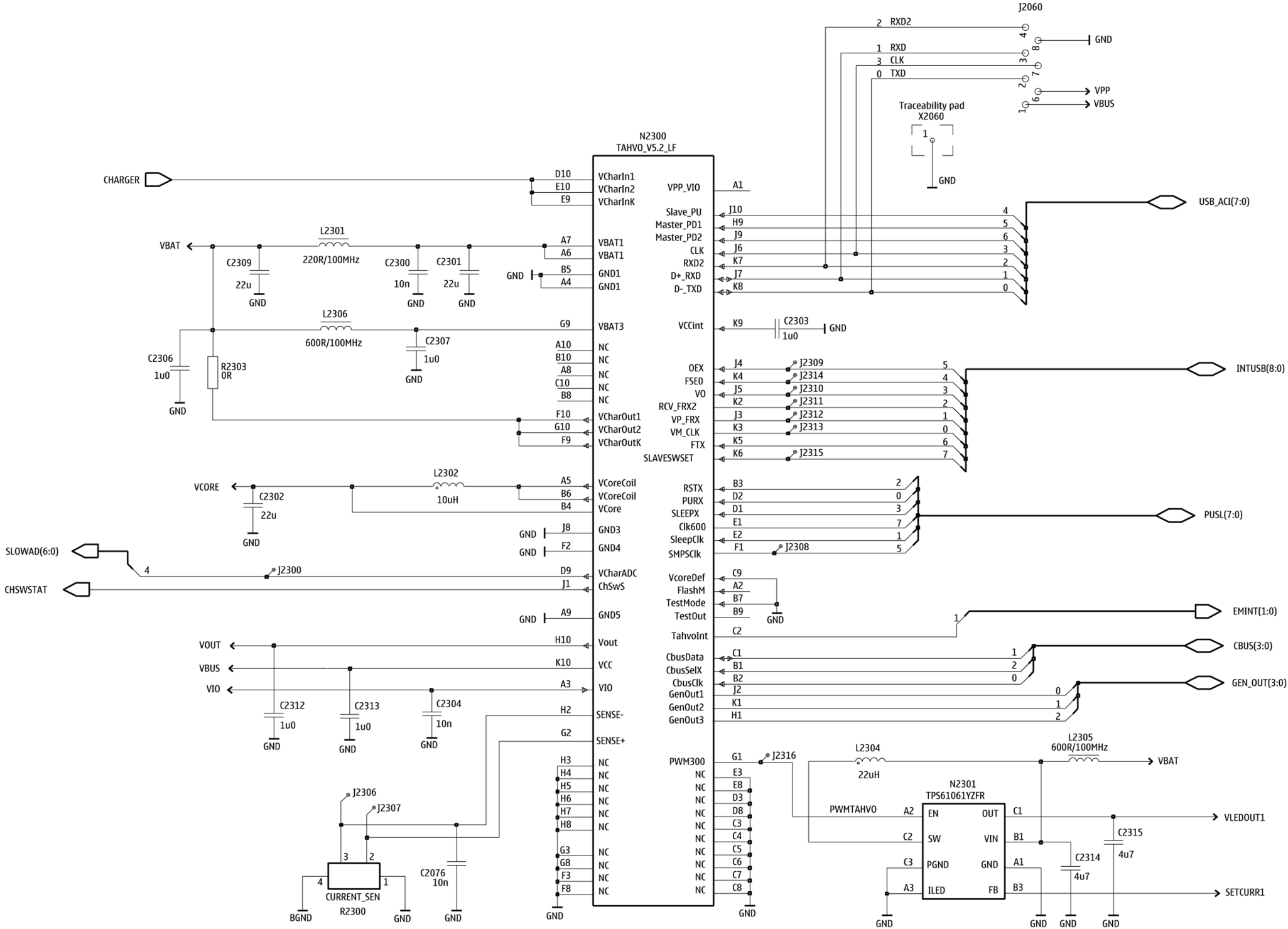




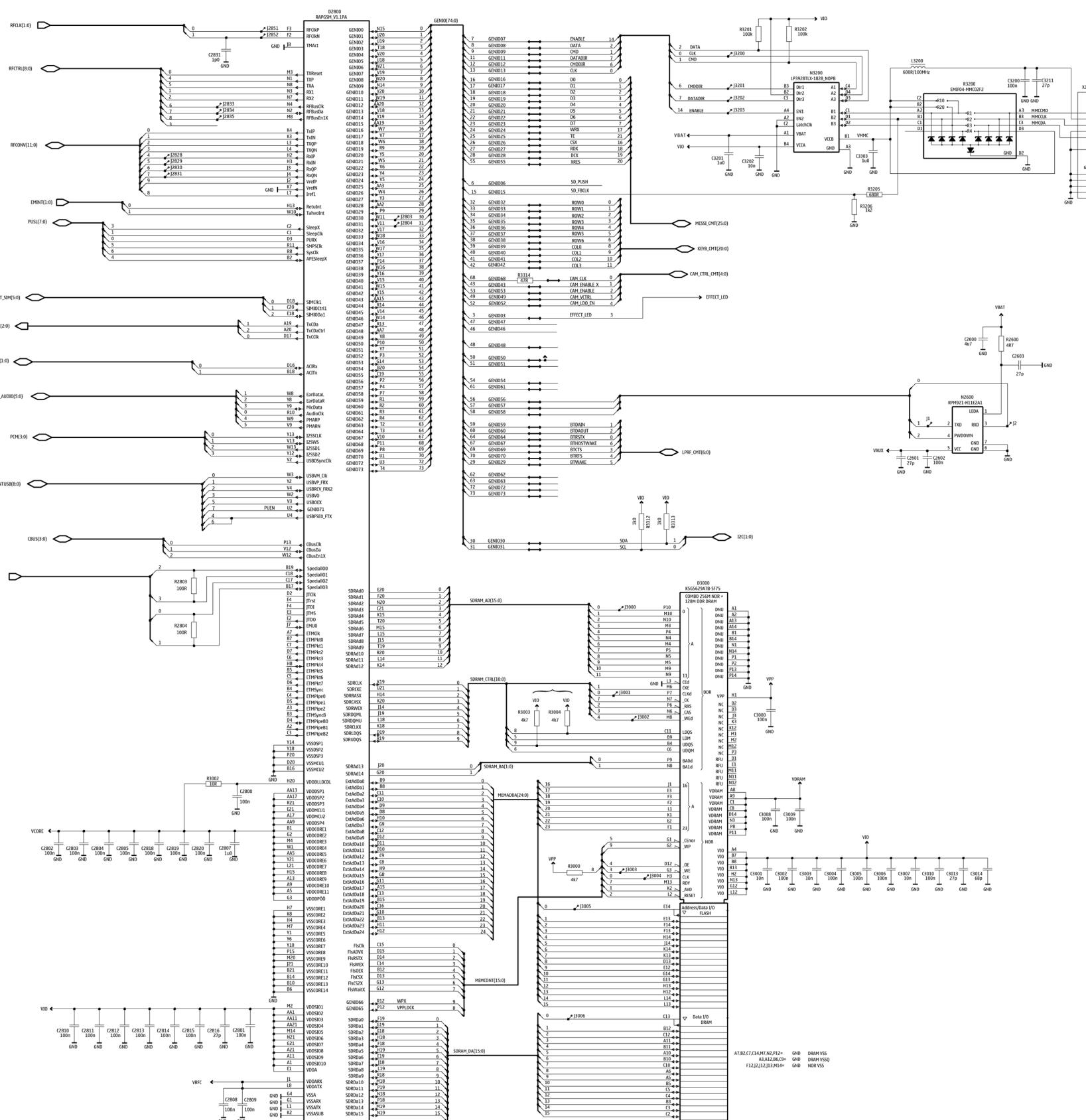
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■ **TAHVO**

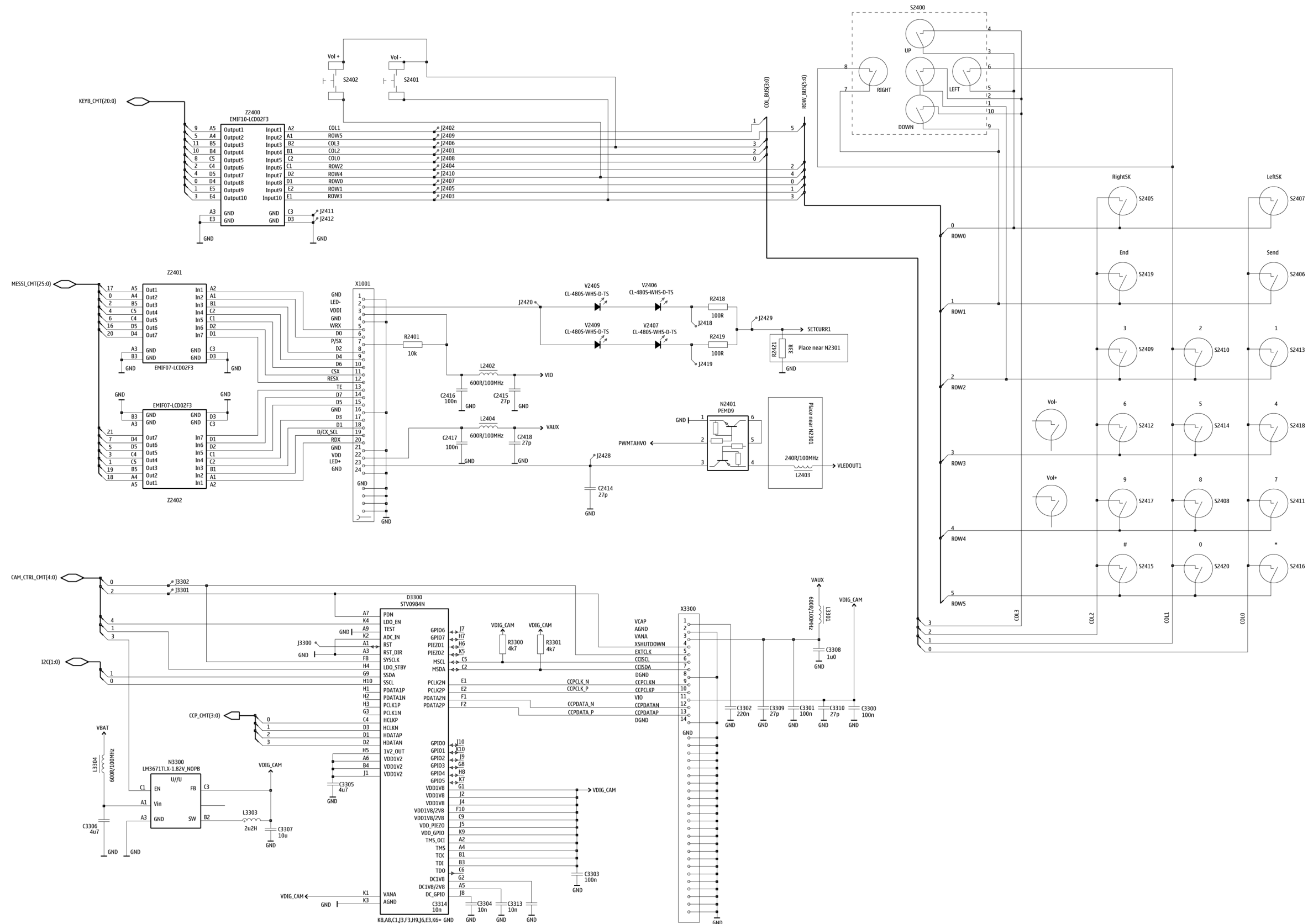


### ■ RAP3G, Combo memory, MicroSD

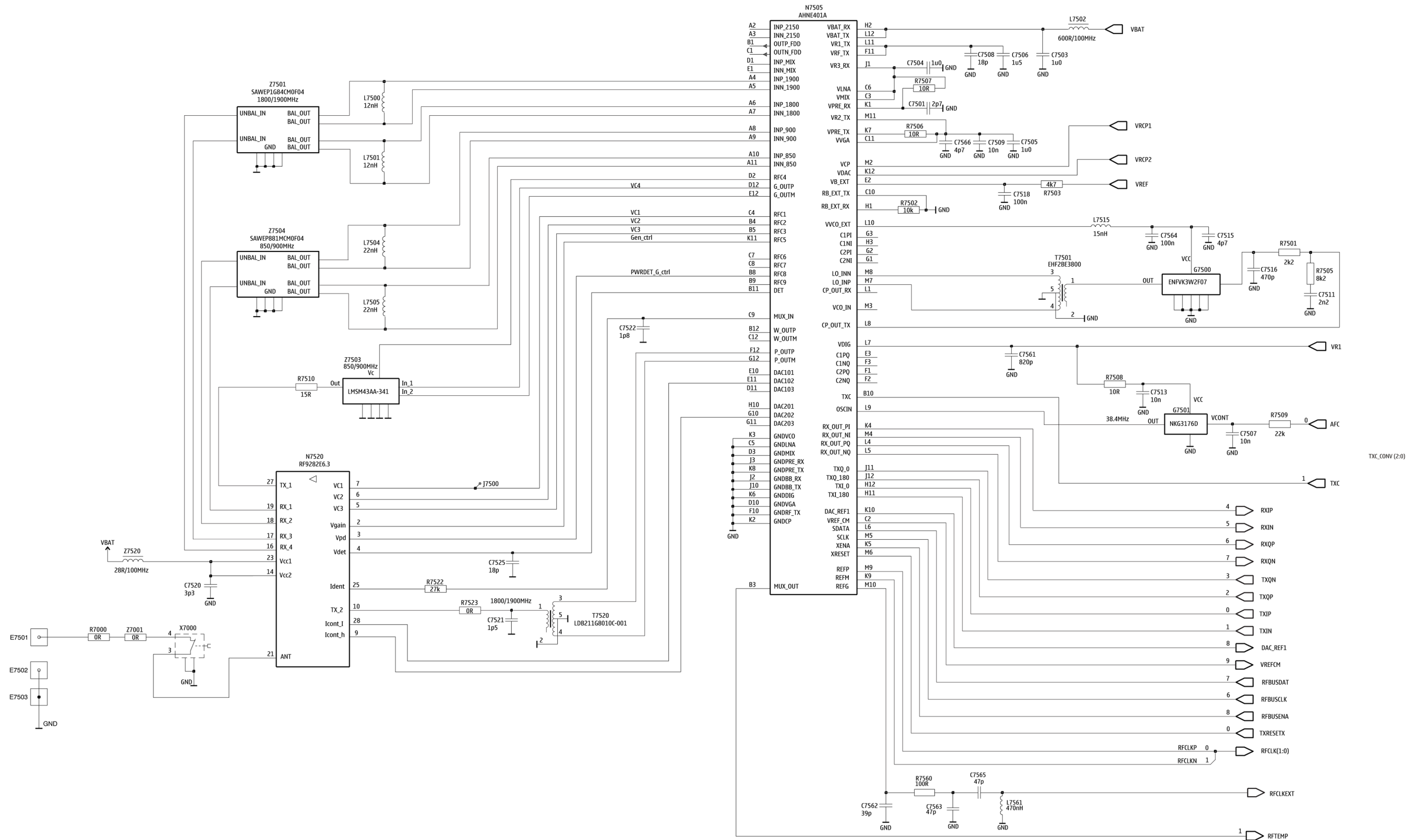




■ User interface, Camera



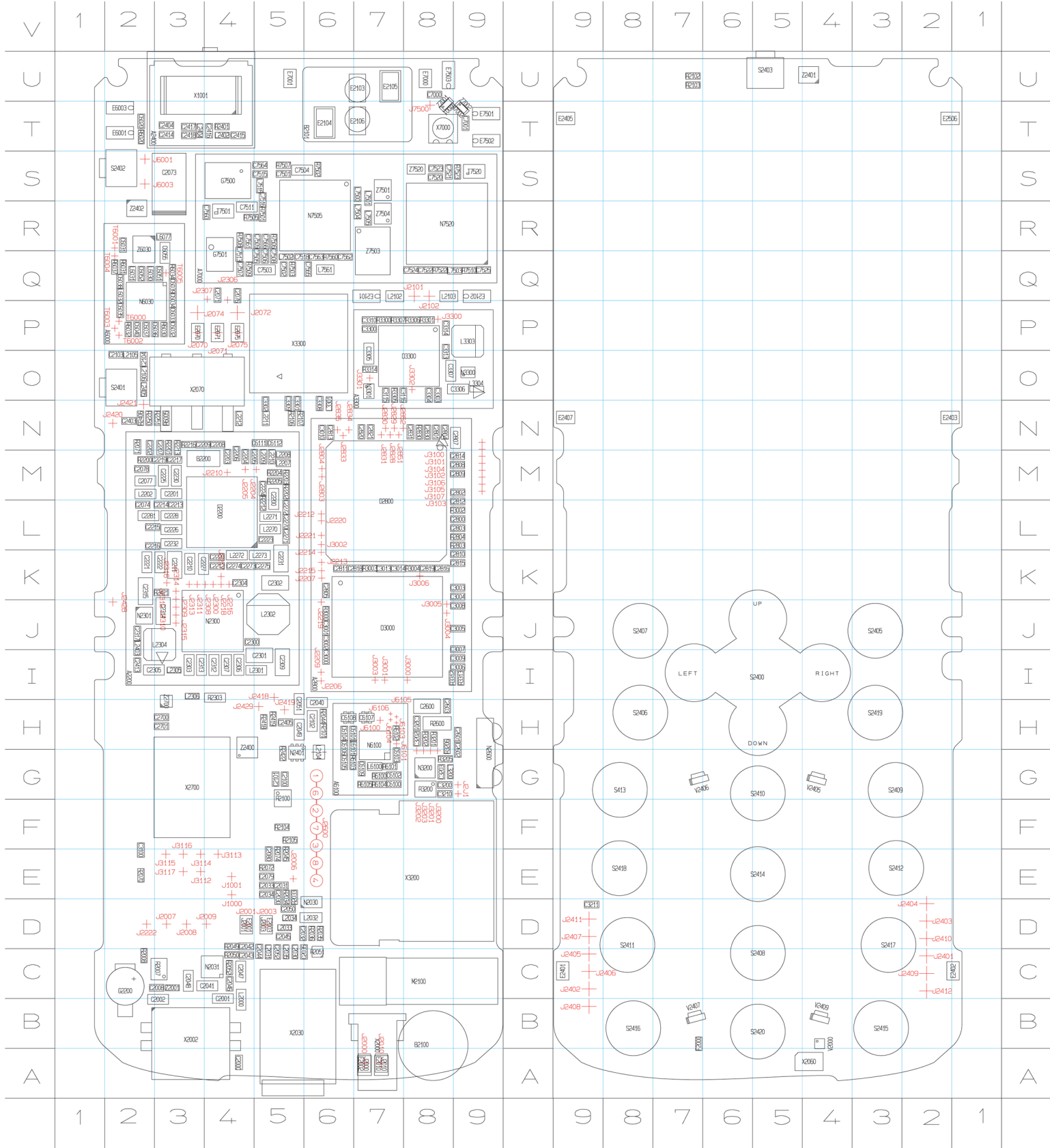
- **RF part**





■ Component finder

B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
B2100	B8	C2274	K4	C3300	P7	E2003	D5	J2209	I6	L2034	D5	R2072	E5	S										
B2101	T7	C2281	L2	C3302	N5	E2010	A7	J2206	I6	L2035	C5	R2074	E5	S2401	O2									
B2200	M3	C2300	J4	C3303	O8	E2071	P4	J3003	I7	L2103	Q8	R2101	H6	S2403	U5									
C		C2301	I5	C3304	O8	E2075	P4	J3000	I8	L2104	G6	R2102	U7	T										
C2000	A4	C2302	K5	C3305	O7	E2101	Q7	J2428	J2	L2105	O2	R2103	U7	T6000	P2									
C2001	B4	C2303	I3	C3306	O9	E2102	Q9	J2309	J3	L2106	O2	R2104	F5	T6001	R2									
C2002	B3	C2304	K4	C3307	O8	E2103	U7	J2315	J3	L2202	M2	R2105	F5	T6002	P2									
C2008	C3	C2305	I2	C3308	N6	E2104	T6	J2310	J3	L2207	M5	R2106	N5	T6003	P2									
C2030	E5	C2306	I4	C3309	N5	E2105	U7	J2312	J3	L2208	M5	R2107	N5	T6004	Q2									
C2031	E5	C2307	I4	C3310	P7	E2106	T7	J2219	J6	L2209	M5	R2200	M2	T6005	Q3									
C2032	D5	C2309	I5	C3313	O8	E2401	C9	J3005	J8	L2210	M5	R2201	N3	T7501	R4									
C2033	E5	C2312	I4	C3314	P8	E2402	C1	J3004	J8	L2211	N5	R2202	M5	T7520	S9									
C2034	E5	C2313	I3	C6020	T2	E2403	N2	J2311	K3	L2212	N4	R2203	M5	V										
C2035	C6	C2314	J3	C6031	R2	E2405	T9	J2313	K3	L2270	L5	R2204	M5	V2000	B4									
C2040	H6	C2315	K2	C6032	P3	E2407	N9	J2314	K3	L2271	L5	R2205	M5	V2405	G4									
C2041	C4	C2317	J2	C6033	P3	E2506	T2	J2316	K3	L2272	K4	R2212	L5	V2406	G7									
C2042	D4	C2403	N2	C6034	P3	E6001	T2	J2217	K4	L2273	K5	R2213	N3	V2407	B7									
C2043	C4	C2404	T3	C6035	P2	E6003	T2	J2216	K4	L2301	L5	R2216	N3	V2409	B4									
C2044	C5	C2405	H5	C6036	P3	E7000	U8	J2218	K4	L2302	J5	R2250	N2	X										
C2045	D5	C2413	I2	C6037	P2	E7001	U5	J2300	K4	L2304	J3	R2251	N3	X1001	U3									
C2046	C4	C2414	T3	C6038	Q2	E7501	T9	J2308	K4	L2305	I3	R2303	I4	X2000	A7									
C2047	C4	C2415	T4	C6039	Q3	E7502	T9	J2214	K6	L2306	I3	R2401	T4	X2002	B3									
C2048	C3	C2416	T4	C6040	P2	E7503	U8	J2213	K6	L2402	T4	R2406	N2	X2030	B5									
C2049	H5	C2417	T3	C6051	Q3	F		J2215	K6	L2403	J2	R2418	H5	X2060	A4									
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C2206	M4	C2816	K8	C7507	Q4	J2001	D4	J2852	N7	R3313	I9													
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C2209	N3	C2820	N7	C7511	R4	J2407	D9	J2851	N7	N2300	J4	R6020	T2											
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C2214	L3	C3001	J6	C7520	S8	J3112	E3	J3301	O7	N3300	O9	R6037	Q2											
C2215	L2	C3002	J6	C7521	S8	J3113	E4	J3302	O8	N3301	O7	R6100	G7											
C2216	L2	C3003	K9	C7522	Q8	J1001	E4	J2074	P3	N6030	P2	R6101	G7											
C2217	M3	C3004	K9	C7523	S8	J1000	E4	J2070	P3	N6100	H7	R6102	H7											
C2219	M3	C3005	J9	C7524	Q8	J2006	E5	J2072	P4	N7505	R6	R6103	G6											
C2220	K4	C3006	I9	C7525	Q9	J2600	F6	J2071	P4	N7520	R8	R6104	G7											
C2221	K2	C3007	J9	C7560	R4	J3200	G8	J2075	P4	R		R6105	G7											
C2222	K3	C3008	J9	C7561	R4	J3201	G8	J3300	P8	R2007	C3	R7001	T8											
C2223	L5	C3009	I9	C7562	Q6	J3202	G8	J2306	Q4	R2008	C2	R7002	T9											
C2224	M5	C3010	N6	C7563	Q6	J3203	G8	J2307	Q4	R2033	E5	R7501	R5											
C2225	M3	C3013	K7	C7564	S5	J1	G9	J2101	Q8	R2034	E5	R7502	S6											
C2226	L3	C3014	K7	C7565	Q6	J2	G9	J2102	Q8	R2035	D6	R7503	Q5											
C2227	K3	C3100	E2	C7566	R5	J2429	H5	J6001	S2	R2036	D6	R7505	R4											
C2228	L3	C3115	O7	D		J2419	H5	J6003	S2	R2044	H6	R7506	R5											
C2230	M3	C3116	O7	D2200	L4	J6100	H7	J7500	T8	R2045	E5	R7507	S5											
C2231	K5	C3200	G8	D2800	L7	J6101	H7	L		R2049	D4	R7508	R4											
C2232	L3	C3201	H8	D3000	J7	J6103	H7	L2000	B4	R2050	C4	R7509	Q4											
C2270	L5	C3202	H8	D3300	O8	J6104	H7	L2030	C5	R2051	C6	R7510	Q9											
C2271	L5	C3203	G8	E		J6105	H7	L2031	C5	R2052	C4	R7522	Q8											
C2272	L5	C3210	G8	E2001	D4	J6106	H7	L2032	D6	R2070	E2	R7523	S9											
C2273	K4	C3211	D9	E2002	A7	J2418	I5	L2033	D5	R2071	N2	R7560	Q6											







# Nokia Customer Care

## Glossary

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A/D-converter	Analog-to-digital converter
ACI	Accessory Control Interface
ADC	Analog-to-digital converter
ADSP	Application DPS (expected to run high level tasks)
AGC	Automatic gain control (maintains volume)
ALS	Ambient light sensor
AMSL	After Market Service Leader
ARM	Advanced RISC Machines
ARPU	Average revenue per user (per month or per year)
ASIC	Application Specific Integrated Circuit
ASIP	Application Specific Interface Protector
B2B	Board to board, connector between PWB and UI board
BB	Baseband
BC02	Bluetooth module made by CSR
BIQUAD	Bi-quadratic ,type of filter function)
BSI	Battery Size Indicator
BT	Bluetooth
CBus	MCU controlled serial bus connected to UPP_WD2,UEME and Zocus
CCP	Compact Camera Port
CDSP	Cellular DSP (expected to run at low levels)
CLDC	Connected limited device configuration
CMOS	Complimentary metal-oxide semiconductor circuit (low power consumption)
COF	Chip on Foil
COG	Chip on Glass
CPU	Central Processing Unit
CSR	cambridge silicon radio
CSTN	Color Super Twisted Nematic
CTSI	Clock Timing Sleep and interrupt block of Tiku
CW	Continuous wave
D/A-converter	Digital-to-analogue converter
DAC	Digital-to-analogue converter
DBI	Digital Battery Interface
DBus	DSP controlled serial bus connected between UPP_WD2 and Helgo
DCT-4	Digital Core Technology
DMA	Direct memory access
DP	Data Package

DPLL	Digital Phase Locked Loop
DSP	Digital Signal Processor
DtoS	Differential to Single ended
EDGE	Enhanced data rates for global/GSM evaluation
EGSM	Extended GSM
EM	Energy management
EMC	Electromagnetic compability
EMI	Electromagnetic interference
ESD	Electrostatic discharge
FCI	Functional cover interface
FPS	Flash Programming Tool
FR	Full rate
FSTN	Film compensated super twisted nematic
GND	Ground, conductive mass
GPIO	General-purpose interface bus
GPRS	General Packet Radio Service
GSM	Group Special Mobile/Global System for Mobile communication
HF	Hands free
HFCM	Handsfree Common
HS	Handset
HSCSD	High speed circuit switched data (data transmission connection faster than GSM)
HW	Hardware
I/O	Input/Output
IBAT	Battery current
IC	Integrated circuit
ICHA	Charger current
IF	Interface
IHF	Integrated hands free
IMEI	International Mobile Equipment Identity
IR	Infrared
IrDA	Infrared Data Association
ISA	Intelligent software architecture
JPEG/JPG	Joint Photographic Experts Group
LCD	Liquid Crystal Display
LDO	Low Drop Out
LED	Light-emitting diode

LPRF	Low Power Radio Frequency
MCU	Micro Controller Unit (microprocessor)
MCU	Multiport control unit
MIC, mic	Microphone
MIDP	Mobile Information Device Profile
MIN	Mobile identification number
MIPS	Million instructions per second
MMC	Multimedia card
MMS	Multimedia messaging service
NTC	Negative temperature coefficient, temperature sensitive resistor used as a temperature sensor
OMA	Object management architecture
OMAP	Operations, maintenance, and administration part
Opamp	Operational Amplifier
PA	Power amplifier
PDA	Pocket Data Application
PDA	Personal digital assistant
PDRAM	Program/Data RAM (on chip in Tiku)
Phoenix	Software tool of DCT4.x
PIM	Personal Information Management
PLL	Phase locked loop
PM	(Phone) Permanent memory
PUP	General Purpose IO (PIO), USARTS and Pulse Width Modulators
PURX	Power-up reset
PWB	Printed Wiring Board
PWM	Pulse width modulation
RC-filter	Resistance-Capacitance filter
RF	Radio Frequency
RF PopPort TM	Reduced function PopPortTM interface
RFBUS	Serial control Bus For RF
RSK	Right Soft Key
RS-MMC	Reduced size Multi Media Card
RSSI	Receiving signal strength indicator
RST	Reset Switch
RTC	Real Time Clock (provides date and time)
RX	Radio Receiver

SARAM	Single Access RAM
SAW filter	Surface Acoustic Wave filter
SDRAM	Synchronous Dynamic Random Access Memory
SID	Security ID
SIM	Subscriber Identity Module
SMPS	Switched Mode Power Supply
SNR	Signal-to-noise ratio
SPR	Standard Product requirements
SRAM	Static random access memory
STI	Serial Trace Interface
SW	Software
SWIM	Subscriber/Wallet Identification Module
TCXO	Temperature controlled Oscillator
Tiku	Finnish for Chip, Successor of the UPP
TX	Radio Transmitter
UART	Universal asynchronous receiver/transmitter
UEME	Universal Energy Management chip (Enhanced version)
UEMEK	See UEME
UI	User Interface
UPP	Universal Phone Processor
UPP_WD2	Communicator version of DCT4 system ASIC
USB	Universal Serial Bus
VBAT	Battery voltage
VCHAR	Charger voltage
VCO	Voltage controlled oscillator
VCTCXO	Voltage Controlled Temperature Compensated Crystal Oscillator
VCXO	Voltage Controlled Crystal Oscillator
Vp-p	Peak-to-peak voltage
VSIM	SIM voltage
WAP	Wireless application protocol
WD	Watchdog
XHTML	Extensible hypertext markup language
Zocus	Current sensor, (used to monitor the current flow to and from the battery)